EXHIBIT 5

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF WISCONSIN

ROCKWELL AUTOMATION, INC. and ROCKWELL AUTOMATION TECHNOLOGIES, INC.,	Case No. 3:10CV718-WMC
Plaintiffs,	
v.	
WAGO CORPORATION and WAGO KONTAKTTECHNIK GMBH & CO. KG,	
Defendants.	

DECLARATION OF RICHARD HOOPER, PH.D., P.E.

I, Richard Hooper, Ph.D., P.E., make the following declaration in lieu of affidavit pursuant to Section 1746 of Title 28 of the United States Code, 28 U.S.C. § 1746:

Introduction & Qualifications

1. Whitham, Curtis, Christofferson & Cook, P.C. on behalf of Defendants has retained me as an expert witness in the above referenced matter. They have asked that I evaluate U.S. Patents 6,745,090 ('090), 6,745,232 ('232), 6,801,813 ('813), 7,058,461 ('461), 7,065,415 ('415) and 7,123,974 ('974) with regards to prior art in the field. I have addressed the patent claims specified in Plaintiffs' infringement contentions.

2. I have a Ph.D. in Robotics and Automation from the University of Texas at Austin, which I received in 1994, and I have over twenty-five years of industrial and research experience in highly technical environments. (See CV, Attachment A to this declaration.)

3. For instance, I am the President of SafeMachines, PLLC (Austin, TX), which provides engineering consulting services and specializes in computer control of machinery and electro-mechanical devices. During the course of my engineering career I have developed computer-controlled machines ranging from simple food packaging systems to complex robots designed to service the International Space Station.

4. For the past seven years I have worked at AAI, Inc. (Austin, Texas), currently as a Principal Engineer. AAI Corporation is a 60-year old company providing unmanned aircraft and

ground control technologies; high-fidelity simulation systems; and automated aerospace test and maintenance equipment employing innovative aerospace and defense technologies. I am responsible for electrical, mechanical and software engineering design and ultimately for the technical success of projects.

5. My time is billed at a rate of $340.00 per hour for my work on this case. There is no other compensation. A list of cases in which I have testified during the previous four years is provided as Attachment B to this declaration.

Methodology

6. I have reviewed and studied the specification, claims and prosecution history of the patents at issue.

7. I have conducted research of prior art technologies and reviewed numerous documents and patents.

8. Attachment C provides a listing of the documents I considered while forming the opinions in this declaration.

9. I understand the validity of a patent claim relies upon, among other things, the novelty and nonobviousness of the claimed invention.

10. It is my understanding that a patent claim is anticipated (and therefore lacking novelty) if all of the essential elements of the claim are contained in a single source of prior art.

11. It is my understanding that the requirement of nonobviousness means that a claimed invention must not have been obvious, at the time of the invention, to a person of ordinary skill in the art to which the subject matter of the invention pertains, in view of the scope and content of the prior art.

12. I understand that a person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the time of the invention. In determining the level of ordinary skill in the art, I considered:

a. my knowledge of the skill and training of colleagues developing computer-controllers for electro-mechanical systems at the time of the invention of the patents,

b. the type of problems encountered in the art,

c. and prior solutions to the problems encountered in the art.

13. I have been asked to provide an opinion about the level of skill of one of ordinary skill in the art during the late 1990's. Based on my experience during this time period, these individuals would typically have an engineering background and several years experience developing computer-based control systems for machinery.

14. With the foregoing in mind, I conclude that one of ordinary skill in the art would have a bachelor's degree (or equivalent) in engineering and three to five years experience developing computer-based control systems.

15. In making my determination as to the validity of the patents I considered the above-referenced materials, as they would have been understood by one of ordinary skill in the art at the time of the inventions of the patents at issue.

Count One: '090 Patent

16. U.S. Patent No. 6,745,090 to Malizia, Jr. ('090) discloses a page back system and method for remote paging in a control system.

17. My analysis as detailed below covers every physical element and all of the functionality described in Claims 1, 7, 9, 10, 15, 18, 20, 25 and 26 of the '090 patent.

18. The analysis shows all of the claim limitations to be met by either by a single piece of prior art, or by combining pieces of prior art. When combining pieces of prior art, I have applied elements according to their known function and described the predictable result of their combination.

Analysis Claim 1

19. The table below shows U.S. Patent 5,727,170 to Mitchell et al. (Mitchell) discloses every element of Claim 1 of the '090 patent.

20. The Mitchell patent, International Publication WO 97/30879 to Greber et al. (Greber), and U.S. Patent 4,200,915 to Struger et al. (Struger) all disclose switches in the context of control and communication systems. I further note that switches are common electrical devices well known to those skilled in the art.

21. With the addition of the switch in electrical communication claim element, Greber meets all of the limitations of Claim 1 of the '090 patent. In this combination the switch is a familiar element, operating according to its known function with predictable results.

22. With the addition of the switch in electrical communication claim element, U.S. Patent 6,304,934 to Pimenta et al. (Pimenta) meets all of the limitations of Claim 1 of the '090 patent. In this combination the switch is a familiar element, operating according to its known function with predictable results.

23. With the addition of the switch in electrical communication claim element, U.S. Patent 5,127,090 to Ruehle et al. (Ruehle) meets all of the limitations of Claim 1 of the '090 patent. In this combination the switch is a familiar element, operating according to its known function with predictable results.

24. With the addition of the switch in electrical communication claim element, Struger meets all of the limitations of Claim 1 of the '090 patent. In this combination the switch is a familiar element, operating according to its known function with predictable results.

25. With the addition of the switch in electrical communication claim element, U.S. Patent 5,122,948 to Zapolin (Zapolin) meets all of the limitations of Claim 1 of the '090 patent. In this combination the switch is a familiar element, operating according to its known function with predictable results.

Cross reference of Claim 1 elements to prior art						
	Mitchell	**Greber**	**Pimenta**	**Ruehle**	**Struger**	**Zapolin**
A communications apparatus…	X	X	X	X	X	X
a first communications interface…	X	X	X	X	X	X
a second communications interface…	X	X	X	X	X	X
a processor in electrical communication…	X	X	X	X	X	X
a switch in electrical communication…	X	*			*	

* indicates the prior art discloses a switch

26. **A communications apparatus for communicating with an industrial control device and a remote device via a communications medium, comprising**:

27. The Mitchell patent discloses a communications apparatus as, "a user definable protocol scheme for a Programmable Logic Controller (PLC), comprising a PLC having at least one input and one output terminal for transmitting and receiving respectively predetermined signals; at least one microprocessor contained in the PLC for executing a plurality of user specified communication protocol schemes; a communications port connected to the PLC for facilitating communication between the PLC and at least one external device according to at least one of the protocol schemes; and a protocol initiation means cooperating with the at least one microprocessor for enabling the PLC to execute one of the plurality of user specified communication protocol schemes via the communications port." (Col. 5, lines 2-14) As further

discussed below, this communications apparatus communicates with an industrial control device and a remote device via a communications medium.

28. Greber discloses a communications apparatus as follows: "a receiver unit linked to said at least one sender unit and capable of individual communication with each of a plurality of sender units, said receiver unit further including interfaces for: i) telemetric communication with a control centre ii) on line communication with at least one computer." (Page 1, lines 30-33 & Page 2, lines 1-2) The receiver unit is the communications apparatus.

29. Pimenta discloses a communications apparatus as follows: "The interface device 10 comprises an interface circuit unit 12, with a serial port connector 13, and two connectors 14 coupled to the circuit unit 12 via a cable 15." (Col. 2, lines 54-57) Interface device 10 is the communications apparatus.

30. The Ruehle patent discloses a communications apparatus as follows: "A MAP Interface Unit (MIU)." (Col. 2, line 56) As further discussed below, this MIU is a communications apparatus that communicates with an industrial control device and a remote device via a communication medium.

31. The Struger patent discloses a communications apparatus as follows: "Referring particularly to 65 FIG. 1, the controller program loader includes a program loader processor 20 which connects to the memory address bus 5, the memory data bus 8, the control lines 12 and the read/write line 6." (Col. 4, lines 64-68) As further discussed below, the "program loader processor 20" is a communications apparatus that communicates with an industrial control device and a remote device via a communication medium.

32. Zapolin discloses: "An industrial control system has a central processing unit and a plurality of remote terminal units coupled to a communication network." (Abstract) As further discussed below, this "central processing unit" is a communications apparatus that communicates with an industrial control device and a remote device via a communication medium.

33. **a first communications interface operative to communicate with the industrial control device using a first communications protocol**

34. The table below cross-references limitations of this claim element to the prior art. Supporting discussion follows after the table.

Claim 1 element cross-referenced to prior art				
	Mitchell	**Ruehle**	**Struger**	**Zapolin**
first communications interface	Communication port 42	LAN card 30	Address bus 5	Modem 21
industrial control device	Plurality of base units 22	First and second PLCs 41, 42"	Controller Processor 9	Programmable controller 12
first communications protocol	Different protocol schemes	SY/NET	Protocol of Address bus 5	Protocol of Modem 21

35. The Mitchell patent discloses this claim element as follows: "Disposed along the periphery of base unit 22 is a communication port 42 which is comprised of a connector which is utilized to interconnect a plurality of base units 22 as well as for communication purposes and as a port for different protocol schemes." (Col. 6, lines 49-53) "Communication port 42" is the first communications interface. The "plurality of base units 22" include an industrial control device. The "different protocol schemes" include the first communication protocol.

36. The Ruehle patent discloses a first communications interface as, "a local area network, or LAN, card 30 for coupling the MIU 20 to a local area network (LAN) 31." (Col. 2, lines 59-62) The "LAN, card 30" is the first communications interface. Ruehle also discloses: "In the present illustration, first and second PLCs 41,42, are shown coupled to the LAN 31." (Col. 3, lines 40-41) The "first and second PLCs 41, 42" include an industrial control device. Ruehle further discloses: "Often, factory control devices, such as programmable logic controllers (PLCs) are interconnected via a local area network, or LAN, such as the SY/NET network 65 of Square D Company." (Col. 1, lines 63-66) The protocol of SY/NET is the first communications protocol.

37. Struger discloses: "Referring particularly to FIG. 1, the controller program loader includes a program loader processor 20 which connects to the memory address bus 5, the memory data bus 8, the control lines 12 and the read/write line 6." (Col. 4, lines 64-68) Memory address bus 5 corresponds to the first communications interface. The protocol of memory address bus 5 corresponds to the first communications protocol. See Struger Col. 3, line 59 to Col. 4, line 41 for a description of the protocol of memory address bus 5. Struger further discloses: "The control

program 4 is executed by a controller processor 9 which connects to the memory buses 5 and 6 and to the control lines 6 and 7." (Col. 3, lines 59-61) Controller processor 9 corresponds to the industrial control device.

38. Zapolin discloses: "The first programmable controller 12 includes a central processor 16 which stores and executes a control program for governing the gas supply system. In addition, the first programmable controller includes a number of functional modules for interfacing the processor module to sensing and actuating devices on the controlled system. Specifically, this programmable controller includes two serial communications modules 17 and 18." (Col. 3, lines 25-34) "Programmable controller 12" corresponds to the "industrial control devlice." Zapolin further discloses: "Each of the serial communications modules 17, 18 and 20 is coupled via a separate modem 21, 22, and 23, respectively, to a communication network 25." (Col. 3., lines 39-41) Modem 21 corresponds to the first communications interface and the protocol of Modem 21 corresponds to the first communications protocol.

39. **a second communications interface operative to communicate with the remote device via the communications medium using a second communications protocol**

40. The table below cross-references limitations of this claim element to the prior art. Supporting discussion follows after the table.

Claim 1 element cross-referenced to prior art			
	Mitchell	**Ruehle**	**Zapolin**
second communications interface	Bus connector 26	Modem 22	Serial port drivers 30
remote device	I/O module 24	MAP device	RTU 26
second communications protocol	I/O databus	MAP	Protocol of Serial port drivers 30

41. The Mitchell patent discloses a second communications interface as follows: "Interconnection of base unit and I/O modules 22, 24 respectively is accomplished by a bus connector 26 which cooperates with I/O expansion ports 32." (Col. 6 lines 10-12) "Bus connector 26" is the second communications interface. I/O module 24 is the remote device. '170 describes the second communications protocol as follows: "Signal line IODB is utilized for the

I/O databus; IORA is the use for the I/O register address; IOWRT-N is used for the I/O write strobe; IORD-N is used for the I/O read strobe and I/O DAFEN is an I/O enable output, all of which are daisy chained through the modules." (Col. 11, lines 4-9)

42. The Ruehle patent discloses a second communications interface as "A MAP Interface Unit (MIU) 20 coupled at a MAP node 21a to a MAP network 21 is illustrated in FIG. 1. The MIU 20 includes a modem 22." (Col.2, lines 56-57) The "modem 22" is the second communications interface. Ruehle further discloses remote devices on the communications medium as "the MAP network includes a plurality of MAP devices." (Col. 2, 19-20) Further, Ruehle "includes a bus controller (not shown) which is connected to the controller board 24 to permit the controller board 24 to communicate with other devices on the MAP network 21." (Col. 3, lines 22-26) These "MAP devices" include the remote device. The Manufacturing Automation Protocol (MAP) is the second communications protocol.

43. Zapolin discloses: "The control system 10 also includes a plurality of remote terminal units 26, each coupled to the communication network 25 by a separate modem 28." (Col. 3, lines 49-51) The "remote terminal units 26" correspond to the remote device. Zapolin further discloses: "The internal circuitry and components of a remote terminal unit 26 are shown in FIG. 2. The serial data lines from the modem 28 are coupled to a serial port driver 30 which electrically interfaces the remote terminal unit to the modem 29." (Col. 3, lines 62-66) The "serial port driver 30" is the second communications interface. The protocol of serial port driver 30 is the second communications protocol. A description of the second communications protocol begins at Col. 4, line 3.

44. **a processor in electrical communication with the first and second communications interfaces and operative to exchange messages with the industrial control device and the communications medium via the first and second communications interfaces**

45. The table below cross-references limitations of this claim element to the prior art. Supporting discussion follows after the table.

Claim 1 element cross-referenced to prior art			
	Mitchell	**Ruehle**	**Zapolin**
processor in electrical communication	80C32 processor	Controller board	Microcomputer 32
first communications interface	Communication port 42	LAN card 30	Modem 21
second communications interface	Bus connector 26	Modem 22	Serial port drivers 30
industrial control device	Plurality of base units 22	First and second PLCs 41, 42	Programmable controller 12

46. The Mitchell patent discloses a processor in communication with the first communication interface, as follows: "Also connected to the 80C32 processor is an RS-485 driver which is thereafter connected to Comm Port connector 42." (Col. 9, lines 10-12) As discussed, "Comm Port connector 42" is the first communications interface. '170 discloses the processor in communication with the second communications interface as follows: "Connected to the 80C32 processor is an ASIC which provides a multitude of functions inherent in PLC devices. Such features and "services" include: ... 6. I/O Bus interfacing for expansion modules 24." (Col. 8, pages 28-43) As discussed, bus connector 26 (the "I/O Bus") is the second communications interface and the "plurality of base units 22," include the industrial control device.

47. The Ruehle patent discloses a processor as follows: "The controller board 24 is a central processing unit which either directly or indirectly through other boards, functionally controls the MIU 20 through PC Bus interface circuitry (not shown). (Col. 2, line 66, through Col. 3, line 1) It also discloses the MIU being in electrical communication with the first communications interface as follows: "Additionally, the MIU 20 exchanges LAN messages comprising LAN requests and LAN responses with first and second PLCs 41, 42 on the LAN 31." (Col. 4, lines 8-11) Ruehle further discloses the MIU in electrical communication with the second communications interface as follows: "The modem 22 as provided by Concord includes a bus controller (not shown) which is connected to the controller board 24 to permit the controller board 24 to communicate with other devices on the MAP network 21." (Col. 3, lines 22-26)

48. The Zapolin patent discloses a processor as follows: "The microcomputer 32 executes a program which controls the operation of the remote terminal unit 26." (Col. 3, line 68 - Col. 4 line 2) Microcomputer 32 is the processor in electrical communication with the first and second communications interfaces.

49. **a switch in electrical communication with the processor and having a first switch state and a second switch state, and wherein the first communications interface selectively communicates using one of the first communications protocol and a third communications protocol according to the switch state, whereby the communications apparatus can be programmed via a programming message from a programming device connected to the first communications interface using the third communications protocol when the switch is in the second switch state** –

50. **Switch in electrical communication** – I define this term as an electro-mechanical device for opening and closing electrical circuits, such as those commonly found to turn lights on and off in a house.

51. The table below cross-references limitations of this claim element to the prior art. Supporting discussion follows after the table.

Claim 1 element cross-referenced to prior art			
	Mitchell	**Greber**	**Struger**
switch	Mode switch 56	Single pole switch	Mode selector switch 28
first communications interface	Communication port 42	modems 1 – 8	Address bus 5
first communications protocol	Different protocol schemes	Radio, cable, etc.	Protocol of Address bus 5
third communications protocol	Create/edit a user program		
second switch state	Stop mode	Figure 2	Run/Monitor

52. The Mitchell patent discloses this claim element as follows: "Mode switch 56 is, in the preferred embodiment of the present invention, a three position switch. When this switch is in

the STOP mode the user is be able to create/edit a user program although execution of the user program is not permissible. When this switch is in the RUN mode, the user program resident in base unit 22 is executed while simultaneously inhibiting the user from creating or editing the user program. However, user data values may be modified while in the RUN mode since changing the value does not edit the program itself. When the switch is in the third or terminal position-TERM, base unit 22 allows mode changes received through the communication port or from intelligent modules (not shown) in order to determine the PLCs operating mode as well as mode change commands which may come from programming or operating interface devices through the communication port." (Col. 7, lines 20-33). "Mode switch 56" is a switch having a first switch state and second switch state. As discussed above, the communications port is the first communications interface. The "Stop mode" corresponds to the second switch state and a protocol to "create/edit a user program" corresponds to the third communications protocol.

53. Greber discloses a switch in electrical communication as follows: "The single pole switch, when in the position shown in Figure 2 allows signals from a sender unit to be displayed by the display. When the switch is in the other position, the receiver may be used to send control signals to the sender units." (Page 15, lines 3-6) Figure 6 of the patent is a block diagram of the receiver unit. This figure shows modems 1 - 8. One of these modems is the first communications interface.

54. The Struger patent discloses: "Referring to FIGS. 1 and 3, the front of the enclosure which contains the programmable controller processor 9 includes a number of switches and indicators which are referred to collectively as the processor front panel 27. On of these switches is a single-pole, four position, mode selector switch 28 which is manually operable to drive four mode control lines. These control lines connect to both processors 9 and 20 and they include a RUN/PROGRAM LOAD line 29, a RUN/MONITOR line 30, a PROGRAM PANEL ENABLE line 31, and an OUTPUTS OFF line 32." (Col. 5, lines 43-50) The "mode selector switch 28" is the switch in electrical communication.

Analysis Claim 7

55. The table below shows that Mitchell in combination with either U.S. Patent 6,201,996 to Crater et al. (Crater), Greber, Ruehle or Struger meets all of the limitations of Claim 7 of the '090 patent.

Cross reference of Claims 1 and 7 elements to prior art					
	Mitchell	**Crater**	**Greber**	**Ruehle**	**Struger**
Claim 1 - A communications apparatus…	X	X	X	X	X
a first communications interface…	X	X	X	X	X
a second communications interface…	X	X	X	X	X
a processor in electrical communication…	X		X	X	X
a switch in electrical communication…	X		*		*
Claim 7 - wherein the communications apparatus is adapted to receive...		X	X	X	X

* indicates the prior art discloses a switch

56. **Claim 7. The apparatus of claim 1, wherein the communications apparatus is adapted to receive a programming message from the communications medium via the second communications interface and to transmit the programming message to the industrial control device via the first communications interface, whereby the industrial control device may be programmed by a programming device connected to the communications medium.**

57. The table below cross-references limitations of this claim element to the prior art. Supporting discussion follows after the table.

Cross reference of claim 7 elements to prior art				
	Crater	**Greber**	**Ruehle**	**Struger**
second communications interface	Network interface	Modem 54	Modem 22	Cable 24
industrial control device	Control system 100	Sender units	First and second PLCs 41, 42	Controller Processor 9
first communications interface	Network interface 125	modems 1 - 8	LAN card 30	Address bus 5
programmed by a programming device	remote programming	control signals to the sender units	read and write registers	edit the programmable controller control program

58. Programming an industrial device remotely was well known. For example, Crater discloses, "the web page may provide authorized users with access to the object components, thereby facilitating remote programming." (Col. 4, lines 42-43) In this citation the network interface is the second communications interface. Crater further discloses as industrial control device as follows: "A representative control system, indicated generally at 100, executes program instructions to operate, for example, a piece of industrial equipment" (Col. 7, lines 54-57) and a first communications interface as "a network interface 125 that connects the controller 100 to a computer network." (Col. 8, lines 11-12)

59. The Greber patent discloses: "The receiver unit has a main block 51 which receives eight inputs and provides 64 relay alarm outputs, controls a printer 52 and monitor 53, provides a control signal for a dial up modem 54 to operate pager 55 and sends signals to two computer workstations 56, 57." (Page 14, lines 21-24) The modem 54 is the second communications interface. The patent also discloses, "at least one sender unit for monitoring field equipment." (Page 1, line 28) The sender unit is the industrial control device. The patent further discloses: "The unit has three bit tables permanently installed in its software and is capable of accepting a further three tables which are input from the CPU interface These tables relate to the alarm bit allocations for level crossings, weather stations an dragging equipment detectors. (Page 9, lines 24-28) The data for the three tables corresponds to the programming message communicated via the second communications interface.

60. The Ruehle patent discloses: "The MIU 20 is transparent to the computer 44 in that each of the PLCs 41,42 appears to the computer 44 as a single virtual manufacturing device. For example, assume the computer 44 wants to read a temperature value that is stored in a particular register of the PLC 41. Rather than needing to know the particular register number of the PLC 41 containing the temperature value, as well as the particular command to read the particular register, the computer 44 needs only to request a temperature read according to standard MAP protocol." (Col. 4, lines 12-22) As seen in Figure 1 of Ruehle, the computer is a remote device on the MAP (second) communications interface and the PLC is an industrial control device on the LAN (first) communications interface. The computer is able to read and write registers on the industrial control device and thus program the device.

Analysis Claim 9

61. When combined with the modem from Ruehle, Zapolin, Greber, Willis or Pimenta, the Mitchell patent describes every element of Claims 1 and 9 of the '090 patent. In this combination the modem is a familiar element, operating according to its known function with predictable results.

62. When combined with the switch from either Mitchell or Greber, Ruehle discloses every element of Claim 9 of the '090 patent.

63. When combined with the switch from either Mitchell or Greber, Zapolin discloses every element of Claim 9 of the '090 patent.

Cross reference of Claim 9 elements to prior art						
	Mitchell	**Ruehle**	**Zapolin**	**Greber**	**Willis**	**Pimenta**
Claim 1 - A communications apparatus…	X	X	X	X		
a first communications interface…	X	X	X	X		
a second communications interface…	X	X	X	X		
a processor in electrical communication…	X	X	X	X		
a switch in electrical communication…	X			*		
Claim 9 - the first communications interface comprises a modem...		X	X	X	X	X

* indicates the prior art discloses a switch

64. **Claim 9. The apparatus of claim 1, wherein the first communications interface comprises a modem, and the second communications interface comprises an RS-232 port.**

65. The table below cross-references limitations of this claim element to the prior art. Supporting discussion follows after the table.

Cross reference of claim 9 elements to prior art					
	Ruehle	**Zapolin**	**Greber**	**Willis**	**Pimenta**
first communications interface	Modem 22	Modem 28	modems 1-8	Modem 30	Modem 60
second communications interface	LAN card 30	Serial port drivers 30	Modem 54		

66. The table above shows that Ruehle, Zapolin, Greber, Willis and Pimenta all disclose modems as the first communications interface. As discussed Mitchell discloses an RS232 port as a communications interface.

67. Selecting a modem for the first communications interface and an RS-232 port for the second communications interface were known design choices. For example, Pimenta discloses, "The CPU 56 receives frames of serial data over the RS-232 interface from the computer 20 and passes the data to the modem 60 for transmission over the Fieldbus." (Col. 4, lines 62-64)

Analysis Claim 10

68. The table below shows Mitchell discloses every element of Claim 10 of the '090 patent.

69. The table below shows Ruehle discloses every element of Claim 10 of the '090 patent.

Cross reference of Claim 10 elements to prior art						
	Mitchell	**Greber**	**Pimenta**	**Ruehle**	**Struger**	**Zapolin**
An industrial control system for controlling a process …	X	X	X	X	X	X
a communications device having…	X	X		X		X
a control device having…	X			X		X
a communications medium…	X			X		X
wherein the control device is adapted to send…	X	X		X		

70. **An industrial control system for controlling a process, comprising**:

71. The comments above for the preamble to Claim 1 apply to this preamble for Claim 10.

72. Mitchell discloses an industrial control system for controlling a process. For example, Mitchell discloses: "Similarly, instead of using a beeper paging scheme, the manufacturing process might use a speech synthesizer to indicate particular faults, draw attention to a particular operator and the like." (Col. 17, lines 32-35)

73. Pimenta discloses an industrial control system for controlling a process that includes a "Computer 20," "interface device 10," and "FIELDBUS 30."

74. In Ruehle, a Manufacturing Automation Protocol (MAP) Interface Unit 20 communicates with various microprocessor based plant floor devices (i.e., industrial control devices) and plant computers. Thus, Ruehle discloses an industrial control system for controlling a process.

75. Struger discloses an industrial control system for controlling a process that includes a "display terminal 23," "program loader processor 20," and "processor 9."

76. Zapolin discloses an industrial control system for controlling a process that includes a "central processor module 16," "communications network 25," and remote terminal units 26."

77. **a communications device having a first communications interface operative to communicate using a first communications protocol, and a second communications interface operative to communicate using a second communications protocol**

78. The table below cross-references limitations of this claim element to the prior art. Supporting discussion follows after the table.

Claim 10 element cross-referenced to prior art				
	Mitchell	**Greber**	**Ruehle**	**Zapolin**
first communications interface	Communication port 42	modems 1-8	LAN card 30	Modem 21
first communications protocol	Different protocol schemes	Telephone line	SY/NET	Protocol on Modem 21
second communications interface	Bus connector 26	Modem 54	Modem 22	Serial port drivers 30
second communications protocol	I/O databus	line, voice frequency link or a radio link	MAP	Protocol of Serial port drivers 30

79. The elements in the table above have been discussed in the context of Claim 1, with the exception of the first and second communications protocols of Greber. Greber discloses the first communication protocol as follows: "Asynchronous port 72 allows dial-up modem 54 (see Figure 4) to be connected to the CPU." (Page 15, lines 22-23) The telephone line protocol is the protocol of the dial-up modem 54. Further, Greber discloses the second communications protocol as: "The unit has a CPU/modem module 30 with the modem providing its output to a transmission link such as a line, voice frequency link or a radio link." (Page 30, lines 24-25)

80. **a control device having a third communications interface adapted for removable connection with the first communications interface and operative to communicate with the communications device using the first communications protocol, and an output operative to interface with a controlled process**

81. The table below cross-references limitations of this claim element to the prior art. These elements have been discussed previously in the context of Claim 1.

Claim 10 element cross-referenced to prior art			
	Mitchell	**Ruehle**	**Zapolin**
control device	Plurality of base units 22	second PLC 42	programmable controller 14
third communication interface	Communication port 42 on plurality of base units	LAN	Modem 23
output operative to interface with a controlled process	I/O module 24	I/O of PLC 42	I/O of programmable controller 14

82. **a communications medium operatively connected to the second communications interface and adapted to communicate with the communications device using the second communications protocol**

83. The table below cross-references limitations of this claim element to the prior art. These elements have been discussed previously in the context of Claim 1.

Claim 10 element cross-referenced to prior art			
	Mitchell	**Ruehle**	**Zapolin**

second communications interface	Bus connector 26	Modem 22	Serial port drivers 30
second communications protocol	I/O databus	MAP	Protocol of Serial port drivers 30

84. **wherein the control device is adapted to send trigger information to the communications device, and wherein the communications device is adapted to selectively construct and transmit a message via the second communications interface according to the trigger information**

85. The table below cross-references limitations of this claim element to the prior art. "Control device" and "second communications interface" have been previously discussed in the context of Claim 1. Supporting discussion on "trigger information" follows after the table.

Claim 10 element cross-referenced to prior art				
	Mitchell	**Greber**	**Ruehle**	**Zapolin**
control device	Plurality of base units 22	sender unit	First and second PLCs 41, 42	Programmable controller 12
trigger information	barcode reader, weighing scale, etc.	control signals to the sender units	messages from the PLCs	
second communications interface	Bus connector 26	Modem 54	Modem 22	Serial port drivers 30

86. Mitchell discloses, "a communication port initiated interrupt is the use of the receive function with respect to a barcode reader, a weighing scale, a welder, a security encoded badge, a credit card type reader, to name a few. In this instance, it is totally up to the user as to the protocol desired and as to the actual characters or code utilized to initiate an interrupt. Alternatively, in a transmit function mode, messages may be sent to a printer or display, all as part of the communication interrupt priority scheme mentioned." (Col. 14, lines 12-20) Information from the barcode reader, weighing scale, etc. corresponds to trigger information.

87. Ruehle discloses: "A further routine disposed between the first coupling routine and the second coupling routine converts messages from the MAP devices on the MAP network to messages to the PLCs on the LAN and converts messages from the PLCs to messages to the MAP devices. These messages are either requests for data or responses with data to these requests." (Abstract) The "messages from the PLCs to the messages to the MAP devices" correspond to trigger information from the control device to the second communications interface.

88. Greber discloses: "The sender unit is the unit which monitors the field equipment and reports back to a receiver unit by the transmission of a multi word coded message either by direct hard wire or by radio link." (Page 3, lines 6-8) This multi-word coded message corresponds to trigger information from the control device to the communications device. Greber further discloses "The new change alarm is transmitted to a CTC computer." (Page 10, lines 20-21) The "new change alarm" corresponds to the constructed message transmitted via the second communications interface.

Analysis Claim 15

89. The table below shows the Ruehle patent discloses every element of Claim 15 of the '090 patent.

90. As further shown in the table, the Mitchell patent in combination with either Crater, Greber, Ruehle or Struger describes every element of claim 15 of the '090 patent.

Cross reference of Claim 15 elements to prior art						
	Mitchell	**Crater**	**Greber**	**Ruehle**	**Struger**	**Zapolin**
Claim 10 - An industrial control system for controlling a process …	X	X	X	X	X	X
a communications device having…	X		X	X		X
a control device having…	X			X		X
a communications medium…	X			X		X
wherein the control device is adapted to send…	X		X	X		

Claim 15… wherein the communications device is further adapted		X	X	X	X	

91. **Claim 15. The industrial control system of claim 10, wherein the communications device is further adapted to receive programming messages from the communications medium via the second communications interface, whereby the communications device may be programmed via the communications medium.**

92. The table below cross-references limitations of this claim element to the prior art. These elements have been previously discussed in the context of Claim 7.

Cross reference of claim 15 elements to prior art				
	Crater	**Greber**	**Ruehle**	**Struger**
second communications interface	Network interface	Modem 54	Modem 22	Cable 24
communications device	Control system 100	Receiver unit	MIU	Program loader processor 20
programmed via the communications medium	remote programming	event message	read and write registers	edit the programmable controller control program

Analysis Claim 18

93. The table below shows the Ruehle patent describe every element of Claim 18 of the '090 patent.

94. The table further shows the Mitchell patent in combination with either Crater, Greber, Ruehle or Struger describes every element of claim 18 of the '090 patent.

Cross reference of Claim 15 elements to prior art						
	Mitchell	Crater	Greber	Ruehle	Struger	Zapolin
Claim 10 - An industrial control system for controlling a process …	X	X	X	X	X	X

a communications device having…	X		X	X		X
a control device having…	X			X		X
a communications medium…	X			X		X
wherein the control device is adapted to send…	X		X	X		
Claim 18… wherein the communications device is adapted		X	X	X	X	

95. **Claim 18. The industrial control system of claim 10, wherein the communications device is adapted to receive a programming message from the communications medium via the second communications interface and to transmit the programming message to the control device via the first communications interface, whereby the control device may be programmed by a programming device connected to the communications medium.**

96. The table below cross-references limitations of this claim element to the prior art. These elements have been previously discussed in the context of Claim 7.

Cross reference of claim 18 elements to prior art				
	Crater	**Greber**	**Ruehle**	**Struger**
second communications interface	Network interface	Modem module 30	Modem 22	Cable 24
first communications interface	Network interface 125	Modem 54	LAN card 30	Address bus 5
programmed by a programming device	remote programming	event message	read and write registers	edit the programmable controller control program

Analysis Claim 20

97. The table below shows Cimplicity Pager 1997 describes every element of Claim 20 of the '090 patent.

98. The table below shows the Greber patent describes every element of Claim 20 of the '090 patent.

Cross reference of Claim 20 elements to prior art		
	Cimplicity Pager 1997	**Greber**
In an industrial communications device…	X	X
obtaining trigger information…	X	X
determining if a trigger condition exists…	X	X
if a trigger condition exists…	X	X
obtaining a data variable…	X	X
creating a pager message…	X	X
transmitting the pager message…	X	X

99. **In an industrial control communications device, a method for sending a message from a control device to a remote device via a communications medium, comprising:**

100. The Cimplicity Pager operation manual of October 1997 discloses an industrial control communications device called a "Paging Server."

101. The Greber patent describes remote monitoring of field equipment, with a specific use described for a railway system. See sender unit (50) which is an industrial control device, and computer workstation (56) or (57) which is a remote device. "Workstations 56 and 57 allow remote monitoring of conditions" (page 14, lines 26-27).

102. **obtaining trigger information via a first communications interface from the control device;**

103. Page 1-3 of the Cimplicity Pager Operation Manual shows a Paging Server receiving Cimplicity Alarms. As described in the Cimplicity Base System 1997 User's Manual, Chapters 4 and 10, an industrial control device, called a programmable controller, monitoring information related to an industrial automation environment generates Cimplicity Alarms. The interface between the Paging Server and the programmable controller is the first communications interface.

104. Greber discloses a receiver unit (51) which receives information (a multiword message) from the sender unit (50), the sender unit being an industrial control device. (Pg. 3, lines 6-8) Greber's multiword message consists of seven words. (Pg. 3, lines 11-26) The sixth word "is an

8 bit word using bits 0 –6 to indicate relay outputs the field units current state of the output relays," which is trigger information. (Pg. 3, lines 22-24)

105. **determining if a trigger condition exists according to the trigger information**;

106. Page 4-4 of the Cimplicity Pager Operation Manual discloses that Cimplicity Pager determines whether a trigger condition exists by examining the AlarmID and Alarm Class of the Cimplicity alarm.

107. According to Greber, when a message from sender unit (50) is received, the receiver unit (51) interprets the received message. (Pg. 4, lines 7- 9 and lines 17-19) The receiver unit determines whether a trigger condition is present based on whether or not "*" (indicating the presence of a trigger condition) is present at the start of the received message. (Pg.11)

108. **if a trigger condition exists, correlating the trigger condition with a data variable**;

109. Cimplicity Pager correlates at least one data variable by associating the alarm text with the pager message. As described on page 10-8 of the Cimplicity Base System User's Manual of October 1997, the alarm text includes a number of data variables, such as "EMERGENCY" (Alarm High), "WARNING" (Warning High), and "TEMP" (Temperature).

110. Greber discloses a receiver unit (51) which communicates by constructing a five word message. (Pg. 9, lines 29-30) The fifth word of the message (entitled DATA) is a data variable such as is claimed in claim 20 of the '090 patent. The DATA of the constructed message by the receiver unit (51) is used to acknowledge "the current status of the field unit," which represents the trigger condition. (Pg. 9, line 29, through Pg. 10, lines 9-11) For the four steps disclosed at pages 10-11 of Greber: "The Receiver Unit will not initiate all four of the above steps unless the change of state contains an alarm status which is recognised by a '*' at the start of the message. Where the '*' is not present the receiver unit carries out the LED update, sends the change to the local computer interface and to the printer, but no audible alarm is initiated and no transmission is made to the CTC controller or pager." (Pg. 11, lines 3-8; see also pg. 11, lines 21-23)

111. **obtaining a data variable from the control device via the first communications interface**;

112. As discussed, Cimplicity Pager receives alarms from a programmable controller. (See for example Cimplicity Base System User's Manual, October 1997 at 4-1, 10-1.) As described on

page 10-8 of the Cimplicity Base System User's Manual of October 1997, the alarm text includes a number of data variables, such as "EMERGENCY" (Alarm High), "WARNING" (Warning High), and "TEMP" (Temperature).

113. According to Greber, the fourth word of the message constructed by receiver unit (51) (entitled DATA) "is an 8 bit word using bits 0-6 to acknowledge inputs [and] bits 8 – 14 data." (Pg. 10, lines 6-7) Bits 8-14 is such a data variable.

114. **creating a pager message including a text string and the data variable**;

115. Cimplicity Pager creates the pager message by beginning with the "Message Prefix," then appending the "alarm text," and then appending the "Message Suffix."

116. According to Greber, the receiver unit (51) generates alarm signals based on the defined event message or the trigger condition, , and the alarm signals are communicated to remote user devices, which may include a remote computer and a pager. (Pg. 2, lines 5-8) The receiver unit (51) constructs a five word message, which includes a text string and a data variable. (Pg. 9, line 29, through Pg. 10, line 11)

117. **transmitting the pager message to a remote device via a second communications interface and the communications medium using a second communications protocol.**

118. Page 1-3 of the Cimplicity Pager Operation Manual shows the Paging Server transmitting the pager message to the "Pager Modem." The interface between the Paging Server and the Pager Modem is the second communications interface.

119. Greber discloses that receiver unit (51) generates alarm signals, which are communicated to remote user devices, which may include a remote computer and a pager. (Pg. 2, lines 5-8) The receiver unit "provides a control signal for a dial up modem 54 to operate pager 55 and sends signals to two computer work stations 56, 57, among other things.

Analysis Claim 25

120. The table below shows the Greber patent describes every element of Claim 25 of the '090 patent.

Cross reference of Claim 20 elements to prior art				
	Crater	**Greber**	**Ruehle**	**Struger**
In an industrial communications device…	X	X	X	X
obtaining trigger information…	X	X	X	X
determining if a trigger condition exists…		X		
if a trigger condition exists…		X		
obtaining a data variable…		X		
creating a pager message…		X		
transmitting the pager message…		X		
Claim 25. … receiving a first message from a first device…	X	X	X	X
transmitting the first message to the control device…	X	X	X	X
receiving a second message…	X	X	X	X
transmitting the second message…	X	X	X	X
whereby the control device may communicate	X	X	X	X

121. **Claim 25. The method of claim 20, further comprising: receiving a first message from a first device connected to the communications medium via the second communications interface;**

122. The table below cross-references limitations of this claim element to the prior art. These elements have been previously discussed.

Cross reference of claim 25 elements to prior art				
	Crater	**Greber**	**Ruehle**	**Struger**
first device	Computer 200	Computer 56	MAP device	Display terminal 23
second communications interface	Network interface	Modem 54	Modem 22	Cable 24

123. **transmitting the first message to the control device via the first communications interface;**

124. The table below cross-references limitations of this claim element to the prior art. These elements have been previously discussed.

Cross reference of claim 25 elements to prior art				
	Crater	**Greber**	**Ruehle**	**Struger**
control device	Computer 100	Sender units	first and second PLCs 41, 42	Controller Processor 9
first communications interface	Network interface 125	modems 1-8		address bus 5

125. **receiving a second message from the control device via the first communications interface;**

126. The table below cross-references limitations of this claim element to the prior art. These elements have been previously discussed.

Cross reference of claim 25 elements to prior art				
	Crater	**Greber**	**Ruehle**	**Struger**
control device	Computer 100	Sender units	first and second PLCs 41, 42	Controller Processor 9
first communications interface	Network interface 125	modems 1-8		address bus 5

127. **transmitting the second message to the first device connected to the communications medium via the second communications interface;**

128. The table below cross-references limitations of this claim element to the prior art. These elements have been previously discussed.

Cross reference of claim 25 elements to prior art				
	Crater	**Greber**	**Ruehle**	**Struger**
first device	Computer 200	Computer 56	MAP device	Display terminal 23
second communications interface	Network interface	Modem 54	Modem 22	Cable 24

129. **whereby the control device may communicate with the first device connected to the communications medium.**

130. The table below cross-references limitations of this claim element to the prior art. These elements have been previously discussed.

Cross reference of claim 18 elements to prior art				
	Crater	**Greber**	**Ruehle**	**Struger**
control device	Computer 100	Sender units	first and second PLCs 41, 42	Controller Processor 9
first device	Computer 200	Computer 56	MAP device	Display terminal 23

Analysis Claim 26

131. As discussed below, the Greber patent describes every element of Claim 26 of the '090 patent.

132. **A communications device for sending a pager message according to a control device condition, comprising:**

133. Greber discloses a communications device for sending a pager message according to a control device condition.

134. **means for obtaining trigger information via a first communications interface from the control device;**

135. The specification of the '090 patent does not identify a structure as corresponding to such means.

136. According to Greber, receiver unit (51) receives information from the sender unit (50), the sender unit being an industrial control device. (Pg. 3, lines 6-8) The information is a multiword message consisting of seven words. (Pg. 3, lines 11-26) The sixth word "is an 8 bit word using bits 0 –6 to indicate relay outputs the field units current state of the output relays," which is trigger information. (Pg. 3, lines 22-24)

137. **means for determining if a trigger condition exists according to the trigger information;**

138. According to Greber, when a message is received from sender unit (50), the receiver unit (51) interprets the received message. (Pg. 4, lines 7-9 and lines 17-19) The receiver unit determines whether a trigger condition exists by checking whether or not '*' (indicated the presence of a trigger condition) is present at the start of the received message. (Pg.11)

139. **means for correlating the trigger condition with a data variable if a trigger condition exists;**

140. The specification of the '090 patent does not identify a structure as corresponding to such means.

141. Greber discloses that receiver unit (51) communicates by constructing a five word message (Pg. 9, lines 29-30) in which the fifth word of the message (entitled DATA) is a data variable such as is claimed by claim 26. The DATA of the message constructed by the receiver unit (51) is used to acknowledge "the current status of the field unit," which represents the trigger condition. (Pg. 9, line 29, through Pg. 10, lines 9-11) For the four steps disclosed at pages 10-11: "The Receiver Unit will not initiate all four of the above steps unless the change of state contains an alarm status which is recognised by a "*" at the start of the message. Where the "*" is not present the receiver unit carries out the LED update, sends the change to the local computer interface and to the printer, but no audible alarm is initiated and no transmission is made to the CTC controller or pager." (Pg. 11, lines 3-8; see also pg. 11, lines 21-23)

142. **means for obtaining a data variable from the control device via the first communications interface;**

143. Greber discloses that the fourth word of the message constructed by receiver unit (51) (entitled DATA) "is an 8 bit word using bits 0-6 to acknowledge inputs [and] bits 8 – 14 data." (Pg. 10, lines 6-7) Bits 8-14 of Greber represent a data variable such as is claimed by claim 26.

144. **means for creating a pager message including a text string and the data variable;**

145. Greber discloses, based on the defined event message or the trigger condition, the receiver unit (51) generates alarm signals, which are communicated to remote user devices, including a remote computer and a pager. (Pg. 2, lines 5-8)

146. **means for transmitting the pager message to a remote device via a second communications interface and the communications medium using a second communications protocol.**

147. According to Greber, alarm signals are generated by receiver unit (51) and are communicated to remote user devices, which may include a remote computer and a pager. (Pg. 2, lines 5-8) The receiver unit, among other things, "provides a control signal for a dial up modem 54 to operate pager 55 and sends signals to two computer work stations 56, 57.

Count Two: '232 Patent

148. U.S. Patent No. 6,745,232 to Blech et al. ('232) discloses strobed synchronization providing diagnostics in a distributed system.

149. My analysis as detailed below covers every physical element and all of the functionality described in Claims 1, 2, 3, 5, 10, 11, and 14 of the '232 patent.

150. The analysis shows all of the claim limitations to be met by either by a single piece of prior art, or by combining pieces of prior art. When combining pieces of prior art, I have applied elements according to their known function and described the predictable result of their combination.

Analysis Claim 1

151. The table below shows the CoDeSys commercial system (CoDeSys 1997) discloses all of the elements of claim 1 of the '232 patent.

152. The table below shows National Instruments' LabVIEW Real Time commercial system (LabVIEW RT 1999) discloses all of the elements of claim 1 of the '232 patent.

Cross reference of Claim 1 elements to prior art		
	CoDeSys 1997	**LabVIEW RT 1999**
A method for performing a function in a control device…	X	X
storing a program in a control device…	X	X
executing at least a portion of the stored program…	X	X
suspending execution of the stored program…	X	X
receiving a mode change message…	X	X

153. **Claim 1 - A method of performing a function in a control device comprising:**

154. The CoDeSys 1997 User's Guide discloses such a method of performing a function in a control device called a logic controller.

155. The LabVIEW RT 1999 commercial system discloses such a method of performing a function in a control device. The LabVIEW RT 1999 system discloses an embedded real-time processor operating in a system with input and output functionality as the control device.

156. **storing a program in a control device, the control device receives a message from a communications medium, the message includes instructions to suspend execution of the stored program at a particular location of the stored program;**

157. The table below cross-references limitations of this claim element to the prior art. Supporting discussion follows after the table.

Claim 1 element cross-referenced to prior art		
	CoDeSys 1997	**LabVIEW RT 1999**
storing a program in a control device	download	download
communications medium	serial port cable	communication channel
instructions to suspend execution	online stop, online breakpoints	step into, step over, set breakpoint tool
at a particular location	between two cycles, at breakpoints	at current location, at breakpoints

158. As described on page 58 of the user's guide, CoDeSys 1997 includes a method of "'Online''Download'" to store a program in the logic controller and "'Online''Stop'" to suspend execution of the program "between two cycles." The guide further describes on page 59 a method of "'Online' 'Breakpoint Dialog'" to suspend execution of the program at a set breakpoint in the program. As described on page 64, these messages are passed from a Personal Computer (PC) to the logic controller via a "serial interface".

159. As described on page 4-2 of the April 1999 user manual, the LabVIEW RT 1999 system includes a method to "download VIs to the RT Series board." In LabVIEW RT 1999 (and standard LabVIEW) VIs are Virtual Instruments. Virtual Instruments are computer programs. An RT Series board is a control device. Page 4-2 of the user manual also discloses a "Communication Channel" between a "Host PC" and "Real-Time Data Acquisition Hardware." "Real-Time Data Acquisition Hardware" includes RT Series boards and corresponds to the control device in this claim. Page 4-3 of the LabVIEW RT 1999 manual further discloses: "You

can use the RT Development System for debugging embedded LabVIEW RT 1999 VIs, even while the embedded LabVIEW RT 1999 VIs run in the RT Series hardware. All the normal LabVIEW debugging facilities, such as probes, breakpoints, and single stepping, are supported." Thus, I will refer to the manual for standard LabVIEW for further information on the specifics of probes, breakpoints and stepping functionality.

160. Page 2-23 of the January 1998 LabVIEW manual discloses "Step Into" and "Step Over" buttons to suspend execution of the running program at its current location. Furthermore, the manual discloses on page G-2 "breakpoint" and "Breakpoint tool" that will suspend execution of the running program at the location of the breakpoint.

161. **executing at least a portion of the stored program in the control device according to the instructions;**

162. As described on page 58 of the user's guide, CoDeSys 1997 includes a method of "'Online''Run'" that "starts the execution of the program."

163. Page 2-23 of the LabVIEW manual discloses: "Click on the Run button to run the VI." This will execute at least a portion of the program.

164. **suspending execution of the stored program according to the instructions;**

165. As described on page 58 of the user's guide, CoDeSys 1997 includes a method of "'Online''Stop'" to suspend execution of the program.

166. As described on page 2-23 of the LabVIEW manual clicking the "Step Into" or "Step Over" buttons will suspend execution of the running program.

167. **receiving a mode change message with instructions therein to execute the stored program in a step mode from the location in which the program was suspended.**

168. As described on page 60 of the user's guide, CoDeSys 1997 includes a number of methods for executing the stored program in step mode. The "'Online' 'Step Over' and 'Online' 'Step In'" messages are two examples of mode change messages.

169. LabVIEW's "Step Over" and "Step Into" functionality corresponds to the mode change functionality of this claim.

Analysis Claim 2

170. The table below shows CoDeSys 1997 discloses all of the elements of claim 2 of the '232 patent.

171. The table below shows LabVIEW RT 1999 discloses all of the elements of claim 2 of the '232 patent.

Cross reference of Claim 2 elements to prior art		
	CoDeSys 1997	**LabVIEW RT 1999**
Claim 1 - A method for performing a function in a control device…	X	X
storing a program in a control device…	X	X
executing at least a portion of the stored program…	X	X
suspending execution of the stored program…	X	X
receiving a mode change message…	X	X
Claim – 2 repeating executing the at least a portion…	X	X

172. **Claim 2 - The method of claim 1, further comprising repeating executing the at least a portion of the stored program and suspending execution of the stored program, in response to another message from the communications medium.**

173. As described on page 60 of the user's guide, CoDeSys 1997 includes a method called "'Online' 'Single Cycle'" for executing a single cycle of the program and then suspending execution. Subsequent "'Online' 'Single Cycle'" messages repeat the execution of a single cycle of the program.

174. As discussed, the LabVIEW manual discloses inserting a breakpoint into a LabVIEW program. The LabVIEW manual further discloses on page 2-23 a "Run" button that will begin execution of a suspended program. One of ordinary skill in the art would understand that inserting a single breakpoint into a program and clicking the "Run" button after the program suspends execution at the breakpoint will cause the system to repeat the execution of a program cycle.

Analysis Claim 3

175. The table below shows CoDeSys 1997 discloses all of the elements of claim 3 of the '232 patent.

176. The table below shows LabVIEW RT 1999 discloses all of the elements of claim 3 of the '232 patent.

Cross reference of Claim 3 elements to prior art		
	CoDeSys 1997	**LabVIEW RT 1999**
Claim 1 - A method for performing a function in a control device…	X	X
storing a program in a control device…	X	X
executing at least a portion of the stored program…	X	X
suspending execution of the stored program…	X	X
receiving a mode change message…	X	X
Claim – 3 providing data to the communications medium…	X	X

177. **Claim 3 - The method of claim 1, further comprising providing data to the communications medium in response to a data request message from a network while execution of the stored program is suspended.**

178. As described on page 119 of the user's guide, CoDeSys 1997 includes a method called "'Extras' 'Read Trace'" to read parameters out of the logic controller. The manual further discloses the message causes a "read" of the logic controller's trace buffer. The user's guide does not limit the trace reading functionality to only being available while a program is executing. Furthermore, one of ordinary skill in the art would have understood that buffer reads are available both when the program is executing and when the program is suspended.

179. This claim further requires a network. As previously discussed the CoDeSys 1997 user's guide describes a control device that communicates with a PC via a serial interface. Together the logic controller and the PC form a network of computing devices in communication via a serial interface.

180. Page 2-22 of the LabVIEW manual discloses "Probe" functionality. These probes correspond to data requests from the host computer. The manual does not limit the probe functionality to only being available while a program is executing. Furthermore, one of ordinary skill in the art would have understood that probe data is available and valid both when the program is executing and when the program is suspended.

181. As discussed the LabVIEW RT 1999 manual discloses a "Host PC" in communication with "Real-Time Data Acquisition Hardware" over a "Communication Channel." Together these elements form a network of computing devices.

Analysis Claim 5

182. The table below shows CoDeSys 1997 discloses all of the elements of claim 5 of the '232 patent.

183. The table below shows LabVIEW RT 1999 discloses all of the elements of claim 5 of the '232 patent.

Cross reference of Claim 5 elements to prior art		
	CoDeSys 1997	**LabVIEW RT 1999**
Claim 1 - A method for performing a function in a control device…	X	X
storing a program in a control device…	X	X
executing at least a portion of the stored program…	X	X
suspending execution of the stored program…	X	X
receiving a mode change message…	X	X
Claim 5 – the mode change message further comprises a step type…	X	X

184. **Claim 5 - The method of claim 1, wherein the mode change message further comprises a step type, and wherein executing the at least a portion of the stored program and suspending execution of the stored program are done according to the step type.**

185. As described on page 60 of the user's guide, CoDeSys 1997 includes methods called "'Online' 'Step Over'" and "'Online' 'Step In.'" These are two step types that execute and then

suspend execution of the stored program. As previously discussed, the user's guide also discloses a method called "'Online' 'Single Cycle'" that steps through one cycle of the program.

186. As previously discussed, the LabVIEW discloses "Step Into" and "Step Over" buttons. Clicking on these buttons generate mode change messages.

Analysis Claim 10

187. The table below shows CoDeSys 1997 discloses all of the elements of claim 10 of the '232 patent.

188. The table below shows LabVIEW RT 1999 discloses all of the elements of claim 10 of the '232 patent.

Cross reference of Claim 10 elements to prior art		
	CoDeSys 1997	**LabVIEW RT 1999**
Claim 1 - A method for performing a function in a control device…	X	X
storing a program in a control device…	X	X
executing at least a portion of the stored program…	X	X
suspending execution of the stored program…	X	X
receiving a mode change message…	X	X
Claim 5 – the mode change message further comprises a step type…	X	X
Claim 10 – repeating executing the at least a portion…	X	X

189. **Claim 10 - The method of claim 5, further comprising repeating executing the at least a portion of the stored program and suspending execution of the stored program, in response to another message from the communications medium.**

190. CoDeSys 1997 supports repeating execution of a program cycle by repeating the "'Online' 'Single Cycle'" message.

191. As discussed above, a single LabVIEW breakpoint in concert with the "Run" button supports repeating the execution of a single program cycle.

Analysis Claim 11

192. The table below shows CoDeSys 1997 discloses all of the elements of claim 11 of the '232 patent.

193. The table below shows LabVIEW RT 1999 discloses all of the elements of claim 11 of the '232 patent.

Cross reference of Claim 11 elements to prior art		
	CoDeSys 1997	**LabVIEW RT 1999**
Claim 1 - A method for performing a function in a control device…	X	X
storing a program in a control device…	X	X
executing at least a portion of the stored program…	X	X
suspending execution of the stored program…	X	X
receiving a mode change message…	X	X
Claim 5 – the mode change message further comprises a step type…	X	X
Claim 11 – providing data to the communications medium in response to a data request message…	X	X

194. **Claim 11 - The method of claim 5, further comprising providing data to the communications medium in response to a data request message from the network while execution of the stored program is suspended.**

195. As discussed, CoDeSys 1997 includes a method called "'Extras' 'Read Trace'" to read parameters out of the logic controller. The user's guide further discloses the message uploads the controller's current trace buffer. The user's guide does not limit this functionality to only being available while a program is executing. Furthermore, one of ordinary skill in the art would have understood that buffer uploads are available when the program is executing and when the program is suspended in step mode. CoDeSys 1997 discloses a network: "an on-line connection from the PC to your PLC (RS232, Ethernet, CAN, etc.)." (CoDeSys 1997, page 57)

196. As previously discussed, page 2-22 of the LabVIEW manual discloses "Probe" functionality. These probes correspond to data requests from the host computer. The manual

does not limit the probe functionality to only being available while a program is executing. Furthermore, one of ordinary skill in the art would have understood that probe data is available and valid both when the program is executing and when the program is suspended in one of the step modes.

Analysis Claim 14

197. The table below shows CoDeSys 1997 discloses all of the elements of claim 14 of the '232 patent.

198. The table below shows LabVIEW RT 1999 discloses all of the elements of claim 14 of the '232 patent.

Cross reference of Claim 14 elements to prior art		
	CoDeSys 1997	**LabVIEW RT 1999**
A method for performing a function in a control device…	X	X
providing a control device …	X	X
receiving a mode change message …	X	X
suspending execution of the program…	X	X
receiving a step command message …	X	X
executing at least a portion of the program …	X	X
suspending execution of the program …	X	X

199. **Claim 14 - A method of performing a function in a control device comprising:**

200. As previously discussed, CoDeSys 1997 discloses such a method for performing a function in a control device.

201. As previously discussed, LabVIEW RT 1999 discloses such a method for performing a function in a control device.

202. **providing a control device that selectively executes a program and receives messages from a network;**

203. As previously discussed, CoDeSys 1997 discloses a control device called a logic controller that executes programs and receives messages from a PC via a serial interface.

Together the logic controller and the PC form a network of computing devices in communication via a serial interface.

204. As previously discussed, the LabVIEW RT 1999 manual describes a control device called "Real-Time Data Acquisition Hardware" that executes programs and receives messages from a "Host PC" via a "Communication Channel." Together these elements form a network of computing devices.

205. **receiving a mode change message from the network;**

206. As previously discussed, CoDeSys 1997 discloses receiving a mode change message from the networked PC via the serial interface.

207. As previously discussed, LabVIEW RT 1999's "Real-Time Data Acquisition Hardware" receives mode change messages over the communication channel from the Host PC.

208. **suspending execution of the program according to the mode change message;**

209. As previously discussed, the logic controller of CoDeSys 1997 will suspend execution of a running program in response to step mode change messages over the serial interface from the networked PC.

210. As previously discussed, LabVIEW RT 1999's "Real-Time Data Acquisition Hardware" will suspend execution of a running program in response to step mode change messages over the communication channel from the Host PC.

211. **receiving a step command message from the network;**

212. As previously discussed, the logic controller of CoDeSys 1997 receives step commands over the serial interface from the networked PC.

213. As previously discussed, LabVIEW RT 1999's "Real-Time Data Acquisition Hardware" receives step command messages over the communication channel from the Host PC.

214. **executing at least a portion of the program in the control device according to the message;**

215. As previously discussed, the logic controller of CoDeSys 1997 executes at least a portion of a program according to commands over the serial interface from the networked PC.

216. As previously discussed, LabVIEW RT 1999's "Real-Time Data Acquisition Hardware" executes at least a portion of a program according to messages over the communication channel from the host PC.

217. **suspending execution of the program according to the message.**

218. As previously discussed, the logic controller of CoDeSys 1997 will suspend execution of a running program in response to a message over the serial interface from the networked PC.

219. As previously discussed, LabVIEW RT 1999's "Real-Time Data Acquisition Hardware" will suspend execution of a running program in response to a message over the communication channel from the Host PC.

Count Three: '813 Patent

220. U.S. Patent No. 6,801,813 to Kay et al. ('813) discloses a method for consistent storage of data in an industrial controller.

221. My analysis as detailed below covers every physical element and all of the functionality described in Claims 1, 2, 3, 4, 5, 6, 7, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, and 22 of the '813 patent.

222. The analysis shows all of the claim limitations to be met by either by a single piece of prior art, or by combining pieces of prior art. When combining pieces of prior art, I have applied elements according to their known function and described the predictable result of their combination.

Analysis Claim 1

223. The table below shows that U.S. Patent 6,519,594 to Li (Li) discloses every element of Claim 1 of the '813 patent.

224. The table below shows that U.S. Patent 6,263,487 issued to Stripf ("Stripf") discloses every element of Claim 1 of the '813 patent.

Cross reference of Claim 1 elements to prior art		
	Li	**Stripf**
An industrial controller system comprising:	X	X
a file system residing…	X	X
an execution engine residing…	X	X

225. **Claim 1 - An industrial controller system comprising:**

226. Stripf discloses a "programmable controller suitable for use in a globally distributed automation network" (Abstract). This is an industrial controller system.

227. Li discloses: "As an embedded system, the computer system can also be used as part of an Internet television system, a set-top box (SF13), within a printer, in a digital video disk (DVD), an industrial controller, a telephone or within an instrumentation device." (Col. 5, lines 37-41) Thus, Li discloses an industrial control system.

228. **a file system residing in a program memory of an industrial controller, the file system having a plurality of file system services;**

229. Stripf discloses: "These software function blocks must be designed so that they are loadable and can be tied into the control program while it is running." (Col. 2, lines 12-14) The software function blocks are contained within a file system and loading of function blocks is one example of a file system service. Stripf further discloses: "A class of software function blocks and a class of input/output modules are deposited in bootstrap unit Ens." (Col. 4, lines 15-17) Depositing software function blocks is another example of a file system service.

230. Li discloses: "The class mapper 175 (FIG. 4) is designed to support most standard storage drivers such as remote file systems for Internet files or a Mini Disk system for local media in the SMAP (Single Media Active Project) group and is analogous to a VFS layer in Unix." (Col. 10, lines 54-59) Thus Li discloses a file system. Li further discloses: "The classes can be stored in a local or remote host server which is linked to the target board by the networking. The third type are ROMs." (Col. 10, lines 63-65) Storing and reading are two examples of file system services.

231. **an execution engine residing in the program memory of the industrial controller, the execution engine adapted to interpret code from an industrial control program, the industrial control program including at least one instruction utilizing one or more of the plurality of file system services.**

232. Stripf discloses an execution engine adapted to interpret code. The programmable controllers 6 are each provided with a code interpreter (IP1, IP2, and IP3). (See Col. 2, line 65, through col. 3, line 1). The code interpreters generate code that can be interpreted by processors PR1, PR2, and PR3 while the control program is running (See Col. 3, lines 1-3).

233. Li discloses "Java Virtual Machines (JVMs) that simultaneously run on the system 112." (Col. 6, lines 22-23) Li further discloses: "A Java class, as described more fully below, contains both definitions and data and is implemented using Java byte codes which can be read by a Java interpreter. Byte codes are machine independent so that they can be executed on any machine." (Col. 6, lines 27-29) Thus Li discloses an execution engine that interprets code from an industrial control program.

Analysis Claim 2

234. The table below shows Li discloses every element of Claim 2 of the '813 patent.

235. The table below shows Stripf discloses every element of Claim 2 of the '813 patent.

Cross reference of Claim 2 elements to prior art		
	Li	**Stripf**
Claim 1 – An industrial controller system comprising:	X	X
a file system residing…	X	X
an execution engine residing…	X	X
Claim 2 – the file system and the execution engine being adapted to load user defined routine files…	X	X

236. **Claim 2 - The system of claim 1, the file system and the execution engine being adapted to load user defined routine files upon loading an industrial control program having one or more header instructions for including a user defined routine file, the included user defined routine file being loaded into the same program space as the industrial control program.**

237. Stripf discloses: "For performance reasons, however, it is advantageous to provide the programmable controller with a Java processor 12 which processes the Java code directly." (Col. 2, lines 39-43) It is well known that Java loads user defined routine files into the same program space as the Java program based on header instructions.

238. Li also discloses Java and thus as stated above discloses loading user defined routine files into the same program space as the industrial control program based on header instructions.

239. Furthermore, user defined routines or programs were well-known at the time. See, for example, U.S. Patent No. 4,787,035 to Bourne, col. 39, lines 4-10 and U.S. Patent No. 5,193,189 to Flood et al., col. 2, lines 8-15, & cols. 38-40 in the claims; U.S. Patent No. 4,302,820 to Struger et al., abstract, etc.; U.S. Patent No. 6,108,587 to Shearer et al., claims.

240. Header instructions were also well-known at the time. For example, Bourne discloses use of a header, col. 13, lines 47, 51, and 53. See, for example, U.S. Patent No. 5,287,548 to Flood et

al., file header 70; U.S. Patent No. 6,853,867 to Klindt et al., col. 1, line 55; US Patent No. 7,421,648 to Davis, Fig. 9 and cols. 21-23, etc.

Analysis Claim 3

241. The table below shows Li discloses every element of Claim 3 of the '813 patent.

242. The table below shows Stripf discloses every element of Claim 3 of the '813 patent.

Cross reference of Claim 3 elements to prior art		
	Li	**Stripf**
Claim 1 – An industrial controller system comprising:	X	X
a file system residing…	X	X
an execution engine residing…	X	X
Claim 2 – the file system and the execution engine being adapted…	X	X
Claim 3 – the user defined routine files being stored in a memory device separate from…	X	X

Claim 3 - The system of claim 2, the user defined routine files being stored in a memory device separate from the program memory.

243. Stripf discloses: "The portability of the code ensures that a programmable controller with a execution system in the form of a Java byte code interpreter can process the Java function blocks sent to the programmable controller over the Internet independently of a processor hardware architecture 11 of the programmable controller (regardless of manufacturer)." (Col. 2, lines 33-39) Because these function blocks are sent over the Internet they are stored in a memory device separate from program memory.

244. Li discloses: "Currently, the storage media is divided into three types. The first type is Local medias, such as Mini Discs, tapes, CDs. Each of the media has its own storage system. The second type is Internet-based hosts. The classes can be stored in a local or remote host server which is linked to the target board by the networking." (Col. 10, lines 60-65) User defined files on "Internet-based" hosts are stored in memory devices separate from the program files.

Analysis Claim 4

245. The table below shows Li discloses every element of Claim 4 of the '813 patent.

246. The table below shows Stripf discloses every element of Claim 4 of the '813 patent.

Cross reference of Claim 4 elements to prior art		
	Li	**Stripf**
Claim 1 – An industrial controller system comprising:	X	X
a file system residing…	X	X
an execution engine residing…	X	X
Claim 2 – the file system and the execution engine being adapted…	X	X
Claim 3 – the user defined routine files being stored	X	X
Claim 4 – the memory device being located…	X	X

247. **Claim 4 - The system of claim 3, the memory device being located at one of the industrial controller and a remote location from the industrial controller.**

248. Stripf discloses: "It is frequently necessary for software function blocks of a control program to be transmitted from a programmable controller of a manufacturing site or from a software pool of this manufacturing site to a programmable controller of another manufacturing site." (Col. 1, lines 22-27) Thus Stripf discloses memory devices being located both locally to and remotely from the industrial controller.

249. Li discloses: "Currently, the storage media is divided into three types. The first type is Local medias, such as Mini Discs, tapes, CDs. Each of the media has its own storage system. The second type is Internet-based hosts. The classes can be stored in a local or remote host server which is linked to the target board by the networking." (Col. 10, lines 60-65) As discussed, user defined files on "Internet-based" hosts are stored in memory devices remote from the industrial controller. Memory devices such as Mini Discs, tapes and CDs are local to the industrial controller.

Analysis Claim 5

250. The table below shows Li combined with the recipe files detailed in numerous publications discloses every element of Claim 5 of the '813 patent.

251. The table below shows Stripf combined with the recipe files detailed in numerous publications discloses every element of Claim 5 of the '813 patent.

Cross reference of Claim 5 elements to prior art			
	Li	**Stripf**	**Numerous**
	X	X	
Claim 1 – An industrial controller system comprising:	X	X	
a file system residing…	X	X	
an execution engine residing…	X	X	
Claim 5 – the file system and the execution engine being adapted to load one or more recipe files…			X

252. **Claim 5 - The system of claim 1, the file system and the execution engine being adapted to load one or more recipe files into an executing industrial control program upon executing a load instruction in an industrial control program.**

253. Use of recipe files in industrial control work was well known. See, for example, U.S. Patent No. 6,453,210 to Belotserkovskiy et al. (Belotserkovskiy), abstract, Figs. 4-5, etc.; U.S. Patent No. 6,438,441 to Jang et al. (Jang), abstract, Fig. 5, etc.; U.S. Patent No. 6,516,233 to Bhagwat et al. (Bhagwat), abstract, Figs. 3 & 5, claims, etc.; U.S. Patent No. 5,792,483 to Siegrist et al. (Siegrist '483), claim 1 at cols. 20-21; U.S. Patent No. 5,911,924 to Siegrist et al. (Siegrist '924); U.S. Patent No. 5,576,946 to Bender et al. (Bender), Fig. 5, claims, etc.; and U.S. Patent No. 6,198,480 to Cotugno et al. (Cotungo) One of ordinary skill in the art would understand that the files disclosed in Li would include recipe files.

254. One of ordinary skill in the art would understand that the files disclosed in Li would include recipe files.

Analysis Claim 6

255. The table below shows Li combined with the recipe files detailed in numerous publications discloses every element of Claim 6 of the '813 patent.

256. The table below shows Stripf combined with the recipe files detailed in numerous publications discloses every element of Claim 6 of the '813 patent.

Cross reference of Claim 6 elements to prior art			
	Li	**Stripf**	**Numerous**
	X	X	
Claim 1 – An industrial controller system comprising:	X	X	
a file system residing…	X	X	
an execution engine residing…	X	X	
Claim 5 – the file system and the execution engine being adapted to load one or more recipe files…			X
Claim 6 – the recipe files being stored at a memory device separate from…	X	X	

257. **Claim 6 - The system of claim 5, the recipe files being stored at a memory device separate from the program memory.**

258. As previously discussed, Li discloses files being stored at a memory device separate from the program memory. One of ordinary skill in the art would have understood at the time of the invention that these files would have included recipe files.

259. As previously discussed, Stripf discloses files being stored at a memory device separate from the program memory. One of ordinary skill in the art would have understood at the time of the invention that these files would have included recipe files.

260. Furthermore, storage of the recipe files in a memory device separate from the program memory was well-known. See, for example, Siegrist '483, claim 1 at cols. 20-21, especially col. 21, lines 13-14; Siegrist '924, col. 9, lines 32-36 ("it is particularly advantageous if all basic data in the form of recipes for the individual products are stored in a memory which is separate from the machine controller, for example in the form of a PC").

Analysis Claim 7

261. The table below shows Li combined with the recipe files detailed in numerous publications discloses every element of Claim 7 of the '813 Patent.

262. The table below shows Stripf combined with the recipe files detailed in numerous publications discloses every element of Claim 7 of the '813 Patent.

Cross reference of Claim 7 elements to prior art			
	Li	**Stripf**	**Numerous**
	X	X	
Claim 1 – An industrial controller system comprising:	X	X	
a file system residing…	X	X	
an execution engine residing…	X	X	
Claim 5 – the file system and the execution engine being adapted to load one or more recipe files…			X
Claim 6 – the recipe files being stored at a memory device separate from…	X	X	
Claim 7 – the memory device being located…	X	X	

263. **Claim 7 - The system of claim 6, the memory device being located at one of the industrial controller and a remote location from the industrial controller.**

264. Stripf discloses: "It is frequently necessary for software function blocks of a control program to be transmitted from a programmable controller of a manufacturing site or from a software pool of this manufacturing site to a programmable controller of another manufacturing site." (Col. 1, lines 22-27) Thus Stripf discloses memory devices being located both locally to and remotely from the industrial controller.

265. Li discloses: "Currently, the storage media is divided into three types. The first type is Local medias, such as Mini Discs, tapes, CDs. Each of the media has its own storage system. The second type is Internet-based hosts. The classes can be stored in a local or remote host server which is linked to the target board by the networking." (Col. 10, lines 60-65) As discussed, user defined files on "Internet-based" hosts are stored in memory devices remote from the industrial

controller. Memory devices such as Mini Discs, tapes and CDs are local to the industrial controller.

Analysis Claim 10

266. The table below shows Li in combination with numerous other publications discloses every element of Claim 10 of the '813 patent.

267. The table below shows Stripf in combination with numerous other publications discloses every element of Claim 10 of the '813 patent.

Cross reference of Claim 10 elements to prior art			
	Li	**Stripf**	**Numerous**
Claim 1 – An industrial controller system comprising:	X	X	
a file system residing…	X	X	
an execution engine residing…	X	X	
Claim 10 – the file system and the execution engine being adapted to log measured data…			X

268. **Claim 10 - The system of claim 1, the file system and the execution engine being adapted to log measured data into a file upon executing an instruction in an industrial control program to record the measured data.**

269. Stripf discloses: "In addition, a universal management engineering system is created in the form of a programming unit and an operating and monitoring device for a globally distributed automation network and also to create a management engineering and information system in the form of workstations and database servers." (Col. 1, lines 45-51) One of ordinary skill in the art at the time would understand that databases in industrial control systems are used to log data.

270. Li discloses a data storage device 104. One of ordinary skill in the art at the time would understand that data storage devices in industrial control systems are used to log measured data.

271. Additionally, logging measured data in industrial control work was well-known. For example, see US Patent No. 4,907,167 to Skeirik (Skeirik), col.19, line 25+, etc.; US Patent No. 4,517,637 to Cassell (Cassell), for "Distributed measurement and control system for industrial processes"; US Patent No. 5,796,602 to Wellan et al. (Wellan), col. 1, line 40+; and US Patent

No. 5,134,574 to Beaverstock et al. (Beaverstock). One of ordinary skill in the art would understand that the files described in Li and Stripf would include data log files.

Analysis Claim 11

272. The table below shows Li in combination with numerous other publications discloses every element of Claim 11 of the '813 patent.

273. The table below shows Stripf in combination with numerous other publications discloses every element of Claim 11 of the '813 patent.

Cross reference of Claim 11 elements to prior art			
	Li	**Stripf**	**Numerous**
Claim 1 – An industrial controller system comprising:	X	X	
a file system residing…	X	X	
an execution engine residing…	X	X	
Claim 10 – the file system and the execution engine being adapted to log measured data…			X
Claim 11 – the file system and the execution engine being adapted to retrieve measured data…	X	X	

274. **Claim 11 - The system of claim 10, the file system and the execution engine being adapted to retrieve measured data from a file upon executing an instruction in an industrial control program to load the measured data.**

275. As discussed, Stripf discloses a database as part of an industrial control system. One of ordinary skill in the art at the time would understand that databases in industrial control systems are used for retrieving measured data.

276. Also as discussed, Li discloses a data storage device as part of an industrial control system. One of ordinary skill in the art at the time would understand that data storage devices in industrial control systems are used for retrieving measured data.

277. Furthermore, retrieving measured data in industrial control work was well known. See, for example, Wellan, col. 4, lines 33-37, 39+.

Analysis Claim 12

278. The table below shows Li in combination with numerous other publications discloses every element of Claim 12 of the '813 patent.

279. The table below shows Stripf in combination with numerous other publications discloses every element of Claim 12 of the '813 patent.

Cross reference of Claim 12 elements to prior art			
	Li	**Stripf**	**Numerous**
Claim 1 – An industrial controller system comprising:	X	X	
a file system residing…	X	X	
an execution engine residing…	X	X	
Claim 10 – the file system and the execution engine being adapted to log measured data…			X
Claim 12 – the measured data file being stored at a memory device separate from…	X	X	

280. **Claim 12 - The system of claim 10, the measured data file being stored at a memory device separate from the program memory.**

281. As discussed, Stripf discloses a database as part of an industrial control system. One of ordinary skill in the art at the time would understand that database memory is distinct and separate from program memory.

282. Figure 2 of Li shows the data storage device 104 to be distinct and separate from RAM 102. RAM 102 is where the program memory resides. Thus, Li discloses the measured data file being stored at a memory device separate from program memory.

283. Furthermore, storage of a measured data file at a memory device separate from program memory was well known. For example see Beaverstock, information from sensors stored in local memory 47a; US Patent No. 5,631,839 to Lemoine (Lemoine), memory 26; and US Patent No. 5,896,292 to Hosaka et al. (Hosaka), floppy disk devices 6501, 6601 (Fig. 65), etc.

Analysis Claim 13

284. The table below shows Li in combination with numerous other publications discloses of Claim 13 of the '813 patent.

285. The table below shows Stripf in combination with numerous other publications discloses of Claim 13 of the '813 patent.

Cross reference of Claim 13 elements to prior art			
	Li	**Stripf**	**Numerous**
Claim 1 – An industrial controller system comprising:	X	X	
a file system residing…	X	X	
an execution engine residing…	X	X	
Claim 10 – the file system and the execution engine being adapted to log measured data…			X
Claim 12 – the measured data file being stored at a memory device separate from…	X	X	
Claim 13 – the memory device being located…	X	X	

286. **Claim 13 - The system of claim 12, the memory device being located at one of the industrial controller and a remote location from the industrial controller.**

287. As discussed, Stripf discloses a database. One of ordinary skill in the art at the time would understand that databases could be located both locally to and remotely from the industrial controller. For example Belotserkovskiy discloses local database 13 and other databases 19.

288. Also as discussed, Li discloses memory devices located both locally to and remote from the industrial controller.

Analysis Claim 14

289. The table below shows Li in combination with numerous publications discloses every element of Claim 14 of the '813 patent.

290. The table below shows Stripf in combination with numerous publications discloses every element of Claim 14 of the '813 patent.

Cross reference of Claim 14 elements to prior art			
	Li	**Stripf**	**Numerous**
Claim 1 – An industrial controller system comprising:	X	X	
a file system residing…	X	X	
an execution engine residing…	X	X	
Claim 14 – the file system and the execution engine being adapted to log trend data upon executing an instruction…			X

291. **Claim 14 - The system of claim 1, the file system and the execution engine being adapted to log trend data into a file upon executing an instruction in an industrial control program to record the trend data.**

292. Logging trend data in industrial control systems was well-known at the time of the invention. For example, Figures 46, 47, and 48 display trend data gathered over a period of days. For the data to be displayed, it must have been logged. Beaverstock discloses a "historian database" in Figure 7. As discussed databases are for logging data. Historical data represents trend data. Bender displays logged trend data in Figure 9. Cotugno discloses a "Trend Setup dialogue box." (Col. 45, line 7) U.S. Patent 5,470,218 to Hillman et al. (Hillman) discloses a trend graph in Figure 17. Lemoine discloses "a data base 14 for collecting information relating to the manufacturing process and to build up a history for the purpose of subsequent use in order to study any slow or to cyclic drifts." (Col. 1, lines 56-60) Slow or cyclic drifts correspond to trend data.

293. As discussed, both Stripf and Li disclose logging data. One of ordinary skill in the art at the time would have understood that this data would have included trend data.

Analysis Claim 15

294. The table below shows Li in combination with numerous publications discloses every element of Claim 15 of the '813 patent.

295. The table below shows Stripf in combination with numerous publications discloses every element of Claim 15 of the '813 patent.

Cross reference of Claim 15 elements to prior art			
	Li	**Stripf**	**Numerous**
Claim 1 – An industrial controller system comprising:	X	X	
a file system residing…	X	X	
an execution engine residing…	X	X	
Claim 14 – the file system and the execution engine being adapted to log trend data upon executing an instruction…			X
Claim 15 – the file system and the execution engine being adapted to retrieve trend data…	X	X	

296. **Claim 15 - The system of claim 14, the file system and the execution engine being adapted to retrieve trend data from a file upon executing an instruction in an industrial control program to load the trend data.**

297. As discussed trend data was well known at the time. As further discussed both Li and Stripf disclose retrieving data. One of ordinary skill in the art at the time would have understood that this data could have included trend data.

Analysis Claim 16

298. The table below shows Li in combination with numerous publications discloses every element of Claim 16 of the '813 patent.

299. The table below shows Stripf in combination with numerous publications discloses every element of Claim 16 of the '813 patent.

Cross reference of Claim 16 elements to prior art			
	Li	**Stripf**	**Numerous**
Claim 1 – An industrial controller system comprising:	X	X	
a file system residing…	X	X	
an execution engine residing…	X	X	
Claim 14 – the file system and the execution engine being adapted to log trend data upon executing an instruction…			X

Claim 16 – the trend data being stored at a memory device separate from…	X	X	

300. **Claim 16 - The system of claim 14, the trend data file being stored at a memory device separate from the program memory.**

301. As discussed both Li and Stripf disclose storing data on memory devices separate from the program memory. One of ordinary skill in the art at the time would have understood that this data could have included trend data.

Analysis Claim 17

302. The table below shows Li in combination with numerous publications discloses every element of Claim 17 of the '813 patent.

303. The table below shows Stripf in combination with numerous publications discloses every element of Claim 17 of the '813 patent.

Cross reference of Claim 17 elements to prior art			
	Li	**Stripf**	**Numerous**
Claim 1 – An industrial controller system comprising:	X	X	
a file system residing…	X	X	
an execution engine residing…	X	X	
Claim 14 – the file system and the execution engine being adapted to log trend data upon executing an instruction…			X
Claim 16 – the trend data being stored at a memory device separate from…	X	X	
Claim 17 – the memory device being located…	X	X	

304. **Claim 17 - The system of claim 16, the memory device being located at one of the industrial controller and a remote location from the industrial controller.**

305. As discussed, both Li and Stripf disclose memory devices located both locally to and remote from the industrial controller. One of ordinary skill in the art at the time would have understood that the data stored and retrieved from these devices could have included trend data.

Analysis Claim 20

306. The table below shows Li in combination with numerous other publications disclose every element of Claim 20 of the '813 patent.

307. The table below shows Stripf discloses every element of Claim 20 of the '813 patent.

Cross reference of Claim 20 elements to prior art			
	Li	**Stripf**	**Numerous**
Claim 1 – An industrial controller system comprising:	X	X	
a file system residing…	X	X	
an execution engine residing…	X	X	
Claim 20 – the industrial control program being a ladder logic program…		X	X

308. **Claim 20 - The system of claim 1, the industrial control program being a ladder logic program.**

309. Ladder logic programs we well-known at the time. For example, in the Abstract section, U.S. Patent 5,801,942 to Nixon et al. (Nixon) discloses the industrial control program being a ladder logic program. Also in the Abstract section, U.S. Patent 5,764,507 to Chuo (Chuo) discloses a programmable controller comprising a random access memory RAM 2 provided for storing a ladder diagram program. Beaverstock also discloses "ladder logic." (Col. 13, line 15)

310. One of ordinary skill in the art could have combined Li with ladder logic according to its known function with predictable results.

311. Stripf discloses "a user creates a control program in the form of a contact plan KOP, a function plan FuP, an instruction list AWL or in any other suitable form, such as that described in the IEC 1131 standard." (Col. 2, lines 47-50) The IEC 1131 standard includes ladder logic as one of the international standards for industrial controller programming.

Analysis Claim 21

312. The table below shows Li discloses every element of Claim 21 of the '813 patent.

313. The table below shows Stripf discloses every element of Claim 21 of the '813 patent.

Cross reference of Claim 21 elements to prior art		
	Li	**Stripf**
an industrial controller with the functionality…	X	X
developing a file system and loading the file system…	X	X
developing an execution engine that interprets instructions…	X	X

314. **Claim 21 - A method for providing, an industrial controller with the functionality associated with utilizing a file system residing in the industrial controller, the method comprising:**

315. As discussed, both Stripf and Li disclose a method for providing an industrial controller with the functionality associated with using a file system residing in the industrial controller.

316. **developing a file system and loading the file system on an industrial controller, the file system having a plurality of file system services;**

317. As discussed, both Stripf and Li disclose developing a file system and loading the system on an industrial controller. The file system in Stripf has a plurality of file system services.

318. **developing an execution engine that interprets instructions of an industrial control program that utilizes at least one of the plurality of file system services.**

319. As discussed, both Stripf and Li disclose developing an execution engine that interprets instructions of an industrial control program that uses at least one of the file system services.

Analysis Claim 22

320. The table below shows Li discloses every element of Claim 22 of the '813 patent.

321. The table below shows Stripf discloses every element of Claim 22 of the '813 patent.

Cross reference of Claim 22 elements to prior art		
	Li	**Stripf**
Claim 21 – an industrial controller with the functionality…	X	X
developing a file system and loading the file system…	X	X
developing an execution engine that interprets instructions…	X	X
Claim 22 – developing an industrial control program…	X	X

322. **Claim 22 - The method of claim 21, further comprising developing an industrial control program including at least one instruction that utilizes one or more file system services and downloading the industrial control program to the industrial controller.**

323. As discussed, both Stripf and Li disclose developing an industrial control program including at least one industrial that uses one or more file system services.

Count Four: '461 Patent

324. U.S. Patent No. 7,058,461 to Malizia, Jr. ('461) discloses a page back system and method for remote paging in a control system.

325. My analysis as detailed below covers every physical element and all of the functionality described in Claims 1, 2, 3, 4, 5, 6, 7, 8, 10, 14, 15, and 17 of the '461 patent.

326. The analysis shows all of the claim limitations to be met by either by a single piece of prior art, or by combining pieces of prior art. When combining pieces of prior art, I have applied elements according to their known function and described the predictable result of their combination.

Analysis Claim 1

327. The table below shows the Cimplicity Pager 1997 commercial product (Cimplicity Pager) discloses every element of Claim 1 of the '461 patent.

328. The table below shows International Publication WO 97/30879 to Greber et al. (Greber) discloses every element of Claim 1 of the '461 patent.

Cross reference of Claim 1 elements to prior art		
	Cimplicity Pager	**Greber**
A system that facilitates communication…	X	X
an industrial control device that monitors…	X	X
a processor that receives information…	X	X

329. **Claim 1 - A system that facilitates communication between an industrial control device and a remote user device, comprising:**

330. As described in the Operation Manual, Cimplicity Pager 1997 is a system for communicating between and industrial control device and a remote user device.

331. The Greber patent describes a system for the remote monitoring of field equipment. (Pg. 1, lines 2-3) Gerber describes the use of field equipment (Pg. 1, lines 23-25) to control a railway system (Pg. 1, lines 3-5), which is inherently industrial. The sender unit (50) of Greber is an industrial control device such as is claimed in Claim 1 of the '461 patent, and the computer

workstation (56) or (57) of Greber is a remote user device such as is claimed in Claim 1 of the '461 patent. "Workstations 56 and 57 allow remote monitoring of conditions" (Pg. 14, lines 26-27)

332. **an industrial control device that monitors information related to an industrial automation environment;**

333. Page 1-3 of the Cimplicity Pager Operation Manual shows a Paging Server receiving Cimplicity Alarms. As described in the Cimplicity Base System 1997 User's Manual, Chapters 4 and 10 (and other chapters), an industrial control device, called a programmable controller, monitoring information related to an industrial automation environment generates Cimplicity Alarms.

334. Greber discloses: "The system has one or more sender units (50) for monitoring field equipment and transmitting a multiword message to a receiver unit (51)." (Abstract) The sender units are industrial control devices that monitor information.

335. **a processor that receives information from the industrial control device, determines whether a trigger condition exists, associates a data variable with the trigger condition, and selectively constructs and transmits a [sic] least one pager message to the remote user device if a trigger condition exists.**

336. The table below cross-references limitations of this claim element to the prior art. Supporting discussion follows after the table.

Claim 1 element cross-referenced to prior art		
	Cimplicity Pager	**Greber**
processor	Paging Server	micro processor in receiver unit (51)
industrial control device	programmable controller	sender unit (50)
data variable	AlarmID, within alarm text	fifth word of message
pager message	prefix, alarm text, suffix	alarm signals
remote user device	pager	pager (55), computers (56) and (57)

337. Page 1-3 of the Cimplicity Pager 1997 Operation Manual shows a Paging Server. One of ordinary skill in the art understands such a server includes a processor. As described in the Base System User's Manual, the industrial control device in Cimplicity is called a programmable controller. Please refer now to page 4-4 of the Cimplicity Pager Operation Manual. Cimplicity Pager determines whether a trigger condition exists by examining the AlarmID and Alarm Class of the Cimplicity alarm. Cimplicity Pager associates at least one data variable with the trigger condition by checking the "Display alarm text on pager" check box. As described on page 10-8 of the Cimplicity Base System User's Manual of October 1997, the alarm text includes a number of data variables, such as "EMERGENCY", (Alarm High) "WARNING" (Warning High) and "TEMP" (Temperature). Cimplicity Pager selectively constructs the pager message by beginning with the "Message Prefix," then appending the "alarm text," and then appending the "Message Suffix." Page 2-1 of the Cimplicity Pager Operation Manual (among others) discloses transmitting the pager message.

338. In the system of Greber: "The receiver unit is a micro processor based unit" (Pg. 9, line 23). The receiver unit (51) of Greber is linked to a sender unit (50) and is capable of communicating with an industrial control device. (Pg. 1, lines 30-32) The receiver unit (51) of Greber receives information (a multiword message) from the sender unit (50). (Pg. 3, lines 6-8) When a message from the sender unit (50) is received, the receiver unit (51) interprets the message that has been received. (Pg. 4, lines 7-9 and lines 17-19) The receiver unit of Greber determines whether a trigger condition is present by checking whether or not the character "*" is present at the start of the received message, with the presence of the "*" character indicating the presence of a trigger condition. (Pg.11) Receiver unit (51) communicates by constructing a five-word message. (Pg. 9, lines 29-30) The fifth word of the message, entitled DATA, is a data variable such as is claimed by Claim 1 of the '461 patent. The DATA of the message constructed by the receiver unit (51) is used to acknowledge "the current status of the field unit," which is the trigger condition. (Pg. 9, line 29, through Pg. 10, lines 9-11) The receiver unit of Greber "provides a control signal for a dial up modem 54 to operate pager 55 and sends signals to two computer work stations 56, 57" among other things. (Pg. 14, lines 23-24) Based on the trigger condition (defined event message), the receiver unit (51) generates alarm signals, and the alarm signals are communicated to remote user devices, which may include a remote computer and a pager. (Pg. 2, lines 5-8) For the four steps disclosed at pages 10-11 of Greber: "The Receiver

Unit will not initiate all four of the above steps unless the change of state contains an alarm status which is recognised by a '*' at the start of the message. Where the '*' is not present the receiver unit carries out the LED update, sends the change to the local computer interface and to the printer, but no audible alarm is initiated and no transmission is made to the CTC controller or pager." (Pg. 11, lines 3-8; see also pg. 11, lines 21-23)

Analysis Claim 2

339. The table below shows Cimplicity Pager in combination with Simatic S7 discloses every element of Claim 2 of the '461 patent.

340. The table below shows Greber discloses every element of Claim 2 of the '461 patent.

Cross reference of Claim 2 elements to prior art			
	Cimplicity Pager	**Greber**	**Simatic S7**
Claim 1 - A system that facilitates communication…	X	X	X
an industrial control device that monitors…	X	X	X
a processor that receives information…	X	X	X
Claim 2 - the processor receives programming information…		X	

341. **Claim 2 - The system of claim 1, the processor receives programming information from the remote user device in response to the at least one pager message and constructs and transmits a programming message to the industrial control device.**

342. Reprogramming industrial controllers via modem was well-known at the time. For example, the Simatic S7-200 (Simatic S7) Programmable Controller System Manual discloses: "The PROFIBUS-DP protocol is designed for high-speed communications with distributed I/O devices (remote I/O). There are many PROFIBUS devices available from a variety of manufacturers. These devices range from simple input or output modules to motor controllers and programmable controllers." (Page 9-4) In addition, Simatic S7 provides user-defined protocols (Freeport), disclosing: "Freeport communications is a mode of operation through which the user program can control the communication port of the S7-200 CPU. Using Freeport

mode, you can implement user-defined communication protocols to interface to many types of intelligent devices." (Page 9-5)

343. Greber discloses: "The receiver unit is a micro processor based unit which can monitor up to sixty three different field stations. The unit has three bit tables permanently installed in its software and is capable of accepting a further three tables which are input from the CPU interface." (Page 9, lines 23-26) The CPU interface is with computers (56) and (57), which are remote user devices. "These tables relate to the alarm bit allocations" (Pg. 9, lines 26-27), which is in response to such a pager message. Greber's receiver unit (51) is capable of communicating with the industrial control device and in addition is linked to the sender unit (50). (Pg. 1, lines 30-32)

344. One of ordinary skill in the art could have combined Cimplicity Pager with the remote pager reprogramming of Simatic S7 with predictable results.

Analysis Claim 3

345. The table below shows Cimplicity Pager discloses every element of Claim 3 of the '461 patent.

346. The table below shows Greber discloses every element of Claim 3 of the '461 patent.

Cross reference of Claim 3 elements to prior art		
	Cimplicity Pager	**Greber**
Claim 1 - A system that facilitates communication…	X	X
an industrial control device that monitors…	X	X
a processor that receives information…	X	X
Claim 3. the remote user device…	X	X

347. **Claim 3 - The system of claim 1, the remote user device is at least one of a telephone, cellular telephone, a personal desktop assistant (PDA), a personal computer, a laptop computer, and a pager.**

348. Cimplicity Pager discloses a pager as such a remote device.

349. Greber discloses such remote devices as being computer workstations (56) and (57) and pager (55).

Analysis Claim 4

350. The table below shows Cimplicity Pager discloses every element of Claim 4 of the '461 patent.

351. The table below shows Greber discloses every element of Claim 4 of the '461 patent.

Cross reference of Claim 4 elements to prior art		
	Cimplicity Pager	**Greber**
Claim 1 - A system that facilitates communication…	X	X
an industrial control device that monitors…	X	X
a processor that receives information…	X	X
Claim 4. pager message comprises at least one text string…	X	X

352. **Claim 4 - The system of claim 1, the at least one pager message comprises at least one text string.**

353. As discussed, Cimplicity Pager constructs a pager text message by beginning with the "Message Prefix," then appending the "alarm text," and then appending the "Message suffix."

354. Greber's receiver unit (51) communicates by constructing a five word message, which includes text strings. (Pg. 9, line 29, through Pg. 10, line 11).

Analysis Claim 5

355. The table below shows Cimplicity Pager discloses every element of Claim 5 of the '461 patent.

356. The table below shows Greber discloses every element of Claim 5 of the '461 patent.

Cross reference of Claim 5 elements to prior art		
	Cimplicity Pager	**Greber**
Claim 1 - A system that facilitates communication…	X	X

an industrial control device that monitors…	X	X
a processor that receives information…	X	X
Claim 5 - the industrial control device is a (PLC)…	X	X

357. **Claim 5 - The system of claim 1, the industrial control device is a programmable logic controller (PLC).**

358. As discussed the Cimplicity Base System User's Manual discloses such an industrial control device.

359. Greber discloses the sender unit "has a CPU 30 coupled to a latch U21," (Page 15, lines 28) Greber further discloses: "Figure 9 shows a digital input circuit" (Page 16, line 6) and "Figure 11 shows a relay output control circuit which may form part of a sender unit." (Page 16, lines 23-24) A CPU coupled with input circuitry and output circuitry is the traditional definition of a PLC.

Analysis Claim 6

360. The table below shows Cimplicity Pager discloses every element of Claim 6 of the '461 patent.

361. The table below shows Greber discloses every element of Claim 6 of the '461 patent.

Cross reference of Claim 6 elements to prior art		
	Cimplicity Pager	**Greber**
Claim 1 - A system that facilitates communication…	X	X
an industrial control device that monitors…	X	X
a processor that receives information…	X	X
Claim 6 - at least one of a Telocator Alphanumeric Paging protocol and an ASCII protocol.	X	X

362. **Claim 6 - The system of claim 1, the processor and the remote user device communicate via at least one of a Telocator Alphanumeric Paging protocol and an ASCII protocol.**

363. Page 1-1 of the Cimplicity Pager Operation discloses the Telocator Alphanumeric Paging (TAP) protocol.

364. Greber discloses: "The Receiver Unit will not initiate all four of the above steps unless the change of state contains an alarm status which is recognised by a "*' at the start of the message." (Page 11. lines 3-5) The remote user device (sender unit) communicates the change of state to the processor (receiver unit). A "*" symbol is a well-known ASCII character.

Analysis Claim 7

365. The table below shows Cimplicity Pager discloses every element of Claim 7 of the '461 patent.

366. The table below shows Greber discloses every element of Claim 7 of the '461 patent.

Cross reference of Claim 7 elements to prior art		
	Cimplicity Pager	**Greber**
A method for communicating…	X	X
receiving information related to…	X	X
determining whether received information…	X	X
associating a data variable	X	X
selectively constructing a pager message…	X	X
transmitting the pager message…	X	X

367. **Claim 7 - A method for communicating between an industrial control device and a remote user device, comprising:**

368. As discussed, Cimplicity Pager discloses a method for communicating between an industrial control device (a programmable controller) and a remote user device (a pager).

369. Greber also describes a method for communicating between an industrial control device (sender unit (50)), and a remote user device (computer workstation (56) or (57)). "Workstations 56 and 57 allow remote monitoring of conditions." (Pg. 14, lines 26-27)

370. **receiving information related to an industrial automation environment from the industrial control device;**

371. As discussed, Cimplicity Pager discloses a paging server that receives information from the industrial control device in the form of alarms.

372. Greber discloses a receiver unit (51) linked to a sender unit (50) and capable of communicating with the sender unit (50), which is the industrial control device. (Pg. 1, lines 30-32) "The sender unit (50) which monitors the field equipment and reports back to a receiver unit (51) by the transmission of a multi word coded message either by direct hard wire or by radio link." (Pg. 3, lines 6-8) The information received relates to railway field equipment (Pg. 1, lines 23-25), which is an industrial automation environment.

373. **determining whether received information indicates a trigger condition;**

374. As discussed, Cimplicity Pager determines whether a trigger condition exists by examining the AlarmID and the Alarm Class.

375. Greber discloses that the receiver unit (51) interprets a message when the message is received from the sender unit (50). (Pg. 4, lines 7-9 and lines 17-19) The receiver unit (51) makes the determination as to whether a trigger condition exists by checking whether "*" (indicating the presence of a trigger condition) is or is not present at the start of the received message. (Pg. 11)

376. **associating a data variable with an extant trigger condition;**

377. As discussed, Cimplicity Pager associates at least one data variable with the alarm condition, including the alarm limit and the data value.

378. In Greber a receiver unit (51) communicates by constructing a five word message (Pg. 9, lines 29-30), with the fifth word of the message (entitled DATA) being is a data variable such as is claimed by Claim 7 of the '461 patent. The DATA word component of the message constructed by the receiver unit (51) is used to acknowledge "the current status of the field unit," which represents (and is therefore associated with) the extant trigger condition. (Pg. 9, line 29, through Pg. 10, lines 9-11)

379. **selectively constructing a pager message comprising a text string and the data variable;**

380. As discussed, Cimplicity Pager constructs a pager text message that includes a prefix, alarm text and a suffix.

381. In Greber, there is a receiver unit (51) constructs a five word message, the message including a text string and a data variable. (Pg. 9, line 29, through Pg. 10, line 11) For the four steps disclosed at pages 10-11 of Greber: "The Receiver Unit will not initiate all four of the above steps unless the change of state contains an alarm status which is recognised by a '*' at the start of the message. Where the '*' is not present the receiver unit carries out the LED update, sends the change to the local computer interface and to the printer, but no audible alarm is initiated and no transmission is made to the CTC controller or pager." (Pg. 11, lines 3-8; see also pg.11, lines 21-23)

382. **transmitting the pager message to the remote user device.**

383. As discussed Cimplicity Pager discloses transmitting the pager message.

384. In Greber, there is a receiver unit (51) which generates alarm signals, the alarm signals being communicated to remote user devices, which may include a remote computer and a pager. (Pg. 2, lines 5-8) The receiver unit "provides a control signal for a dial up modem 54 to operate pager 55 and sends signals to two computer work stations 56, 57" among other things. For example: "The Receiver Unit of a level crossing remote monitoring system processes the message as follows: . . . Three: A pager message is transmitted to the responsible maintenance staff informing them of the event. . . . Five: The new change of state is sent to the PC interfaced with the receiver unit." (Pg. 10, line 16, through Pg. 11, line 2)

Analysis Claim 8

385. The table below shows Cimplicity Pager in combination with Simatic S7 discloses every element of Claim 8 of the '461 patent.

386. The table below shows Greber discloses every element of Claim 8 of the '461 patent.

Cross reference of Claim 8 elements to prior art			
	Cimplicity Pager	**Greber**	**Simatic S7**
Claim 7 - A method for communicating…	X	X	
receiving information related to…	X	X	
determining whether received information…	X	X	
associating a data variable	X	X	

selectively constructing a pager message…	X	X	
transmitting the pager message…	X	X	
Claim 8 - further comprising permitting a user…		X	X

387. **Claim 8 - The method of claim 7, further comprising permitting a user to transmit a programming message via the remote user device.**

388. Reprogramming industrial controllers via modem was well-known at the time. For example, the Simatic S7-200 (Simatic S7) Programmable Controller System Manual discloses: "The PROFIBUS-DP protocol is designed for high-speed communications with distributed I/O devices (remote I/O). There are many PROFIBUS devices available from a variety of manufacturers. These devices range from simple input or output modules to motor controllers and programmable controllers." (Page 9-4) In addition, Simatic S7 provides user-defined protocols (Freeport), disclosing: "Freeport communications is a mode of operation through which the user program can control the communication port of the S7-200 CPU. Using Freeport mode, you can implement user-defined communication protocols to interface to many types of intelligent devices." (Page 9-5)

389. In Greber, there is a receiver unit (51) which "has three bit table tables permanently installed in its software and is capable of accepting a further three tables which are input from the CPU interface"(Pg. 9, lines 24-26), is the remote user device claimed by Claim 8 of the '461 patent. "These tables relate to the alarm bit allocations..." (Pg. 9, lines 26-27)

390. One of ordinary skill in the art could have combined Cimplicity Pager with the remote pager reprogramming of Simatic S7 with predictable results.

Analysis Claim 10

391. The table below shows Cimplicity Pager in combination with Simatic S7 discloses every element of Claim 10 of the '461 patent.

392. The table below shows Greber discloses every element of Claim 10 of the '461 patent.

Cross reference of Claim 10 elements to prior art			
	Cimplicity Pager	**Greber**	**Simatic S7**
Claim 7 - A method for communicating…	X	X	
receiving information related to…	X	X	
determining whether received information…	X	X	
associating a data variable	X	X	
selectively constructing a pager message…	X	X	
transmitting the pager message…	X	X	
Claim 8 - further comprising permitting a user…		X	X
Claim 10 – at least one of a Telocator Alphanumeric Paging protocol and an ASCII protocol …	X	X	

393. **Claim 10 - The method of claim 8, at least one of the pager message and the programming message is constructed and transmitted via at least one of a Telocator Alphanumeric Paging protocol and an ASCII protocol.**

394. As discussed, Cimplicity Pager discloses the Telocator Alphanumeric Paging (TAP) protocol.

395. Greber discloses: "The Receiver Unit will not initiate all four of the above steps unless the change of state contains an alarm status which is recognised by a "*' at the start of the message." (Page 11. lines 3-5) The remote user device (sender unit) communicates the change of state to the processor (receiver unit). A "*" symbol is a well-known ASCII character.

Analysis Claim 14

396. The table below shows Cimplicity Pager discloses every element of Claim 14 of the '461 patent.

397. The table below shows Greber discloses every element of Claim 14 of the '461 patent.

Cross reference of Claim 14 elements to prior art		
	Cimplicity Pager	**Greber**
A system that facilitates communication…	X	X
means for detecting extant trigger conditions…	X	X
means for assigning a data variable…	X	X
means for translating information…	X	X
means for transmitting…	X	X

398. **Claim 14 - A system that facilitates communication between an industrial control device and a remote user device and selective reprogramming of the industrial control device, comprising:**

399. As discussed, Cimplicity Pager discloses such a system.

400. Greber describes a system for the remote monitoring of field equipment. (Pg. 1, lines 2-3) Industrial control makes use of field equipment. (Pg. 1, lines 23-25) The specific use is described for a railway system (Pg. 1, lines 3-5), which is inherently industrial. Sender unit (50) is such an industrial control device. Computer workstation (56) or (57) is such a remote user device. "Workstations 56 and 57 allow remote monitoring of conditions" (Pg. 14, lines 26-27) Greber discloses a communications apparatus as follows: "a receiver unit linked to said at least one sender unit and capable of individual communication with each of a plurality of sender units, said receiver unit further including interfaces for: i) telemetric communication with a control centre ii) on line communication with at least one computer." (Page 1, lines 30-33 & Page 2, lines 1-2) The receiver unit is the communications apparatus.

401. **means for detecting extant trigger conditions in an industrial automation environment;**

402. The specification of the '461 patent does not identify a structure as corresponding to such means.

403. As discussed, Cimplicity Pager discloses a means for detecting extant trigger conditions.

404. Greber discloses receiver unit (51) communicates by constructing a five word message. (Pg. 9, lines 29-30) The fifth word of the message, entitled DATA, is such a data variable. The

DATA of the constructed message by the receiver unit (51) is used to acknowledge "the current status of the field unit,"which represents the extant trigger condition. (Pg. 9, line 29, through Pg. 10, lines 9-11).

405. **means for assigning a data variable to the trigger condition;**

406. The specification of the '461 patent does not identify a structure as corresponding to such means.

407. As discussed, Cimplicity Pager discloses a means for assigning a data variable.

408. In Greber, there is a receiver unit (51) which communicates by constructing a five-word message (Pg. 9, lines 29-30), the fifth word of the message (entitled DATA) being the data variable claimed by Claim 14 of the '461 patent. The receiver unit (51) makes a determination as to whether to assign the data variable to a trigger condition by checking whether "*" (indicating the presence of a trigger condition) is or is not present at the start of the received message. (Pg. 11)

409. **means for translating information indicative of the extant trigger condition into at least one pager message;**

410. The specification of the '461 patent does not identify a structure as corresponding to such means.

411. As discussed, Cimplicity Pager discloses a means for translating information.

412. In Greber, a receiver unit (51) communicates by constructing a five-word message (Pg. 9, lines 29-30), the fifth word of which (entitled DATA) is the data variable claimed by Claim 14. The DATA of the constructed message by the receiver unit (51) is used to acknowledge "the current status of the field unit," which represents the trigger condition. (Pg. 9, line 29, through Pg. 10, lines 9-11)

413. **means for transmitting the at least one pager message to a remote user device to alert a user to the extant trigger condition.**

414. As discussed, Cimplicity Pager discloses a means for transmitting.

415. In Greber, the receiver unit "provides a control signal for a dial up modem 54 to operate pager 55 and sends signals to two computer work stations 56, 57" (Pg. 14, lines 23-24), among other things.

Analysis Claim 15

416. The table below shows Cimplicity Pager in combination with Simatic S7 discloses every element of Claim 15 of the '461 patent.

417. The table below shows Greber in combination with Simatic S7 discloses every element of Claim 15 of the '461 patent.

Cross reference of Claim 15 elements to prior art			
	Cimplicity Pager	**Greber**	**Simatic S7**
A system that facilitates communication…	X	X	
means for detecting extant trigger conditions…	X	X	
means for assigning a data variable…	X	X	
means for translating information…	X	X	
means for transmitting…	X	X	
Claim 15 - means for reprogramming…			X

418. **Claim 15 - The system of claim 14, further comprising means for reprogramming the industrial control device via the remote user device.**

419. The specification of the '461 patent does not identify a structure as corresponding to such means.

420. As discussed, Simatic S7 discloses remote reprogramming via a pager.

421. One of ordinary skill in the art could have combined Cimplicity Pager with the remote pager reprogramming of Simatic S7 with predictable results.

422. One of ordinary skill in the art could have combined Greber with the remote reprogramming of Simatic S7 with predictable results.

Analysis Claim 17

423. The table below shows Cimplicity Pager discloses every element of Claim 17 of the '461 patent.

424. The table below shows Greber discloses every element of Claim 17 of the '461 patent.

Cross reference of Claim 17 elements to prior art		
	Cimplicity Pager	**Greber**
Claim 14 - A system that facilitates communication…	X	X
means for detecting extant trigger conditions…	X	X
means for assigning a data variable…	X	X
means for translating information…	X	X
means for transmitting…	X	X
Claim 17 – at least one pager message comprising at least one text string and a data variable…	X	X

425. **The system of claim 14, the at least one pager message comprising at least one text string and a data variable associated with the extant trigger condition.**

426. As discussed, Cimplicity Pager discloses constructing a text string with at least one data variable.

427. Greber discloses: "ONE: The new change of state is updated on the LED panel display for future integration. TWO: The new change alarm is transmitted to a CTC computer or dial up to dark territory controllers The CTC computer raises a Prompt on the CTC controllers panel. The controller is required to notify the relative maintenance staff of the alarm raised. THREE: A pager message is transmitted to the responsible maintenance staff informing them of the event." (Page 10, lines 18-27) The change of state corresponds to the data variable in the claim and the pager message is a text string.

Count Five: '415 Patent

428. U.S. Patent No. 7,065,415 to Kay et al. ('415) discloses a method for consistent storage of data in an industrial controller.

429. My analysis as detailed below covers every physical element and all of the functionality described in Claims 1, 2, 3, 4, 5, 8, and 13 of the '415 patent.

430. The analysis shows all of the claim limitations to be met by either by a single piece of prior art, or by combining pieces of prior art. When combining pieces of prior art, I have applied elements according to their known function and described the predictable result of their combination.

Analysis Claim 1

431. The table below shows U.S. Patent 5,764,507 to Chuo (Chuo) discloses every element of Claim 1 of the '415 patent.

432. The table below shows the TRiLOGI commercial product of 1999 (TRiLOGI) discloses every element of Claim 1 of the '415 patent.

Cross reference of Claim 1 elements to prior art		
	Chuo	**TRiLOGI**
An editor for developing ladder logic programs:	X	X
a first instruction that employs a file system to log data…	X	*
a second instruction that employs a file system to retrieve data…	X	*
an implementation for converting the ladder logic instructions…	X	X

* indicates the file system resides on a networked computer

433. **Claim 1 - An editor for developing ladder logic programs that control operation of an industrial controller system, the editor comprising:**

434. In Chuo, a ladder diagram editing module (see, for example, abstract and Fig. 4) provides a programmable logic controller with personal computerized ladder diagram to replace high level computer languages (see, for example, col. 1, lines 30-33). An edited ladder diagram is translated into an instruction algorithm to control operation of an industrial control system, for example,

access switch, pressure valve, analog signal control devices, servomotor, etc. (Col. 2, lines 43-54)

435. The TRiLOGI Programmer's Reference discloses such an editor.

436. **a first instruction that employs a file system that resides on an industrial controller to log data to a file containing ladder logic instructions;**

437. In Fig. 3 Chuo discloses ladder diagram editing function block 34. In the figure Chuo discloses this function block as: "Executing ladder diagram program, calling edition file, proceeding multi-page ladder diagram design, saving." Saving the file corresponds to logging the data to a file containing ladder logic instructions.

438. The TRiLOGI Programmer's Reference discloses such a file system to log data to a file containing ladder logic instructions. See for example the "Save" operation on page 2-1. In TRiLOGI the file system is on a computer that is networked with the industrial controller. One of ordinary skill in the art would have understood a networked computer would have provided the same file services as the industrial controller with the same predictable results.

439. **a second instruction that employs the file system to retrieve the data from the file containing ladder logic instructions;**

440. Also in Figure 3, Chuo discloses "Translating ladder diagram program" as part of PLC Control Monitor function block. Translating the ladder diagram program necessarily includes retrieving the data from the containing the ladder logic instructions.

441. The TRiLOGI Programmer's Reference discloses such a file system to retrieve data from a file containing ladder logic instructions. See for example the "Load" operation on page 2-1. In TRiLOGI the file system is on a computer that is networked with the industrial controller. One of ordinary skill in the art would have understood a networked computer would have provided the same file services as the industrial controller with the same predictable results.

442. **an implementation for converting the ladder logic instructions into instructions understandable and executable by an execution engine in the industrial controller.**

443. As discussed, in Figure 3 Chuo discloses "Translating ladder diagram program" as part of PLC Control Monitor function block. Chuo discloses "translating" corresponds to "translating

the ladder program into instruction algorithm." (Col. 2, lines 57-58) The instruction algorithm is executable.

444. The TRiLOGI Programmer's Reference discloses, "compiling" the ladder program. See for example page 3-12 of the manual. Compiling a ladder logic program corresponds to converting ladder logic instructions into instructions understandable and executable by an execution engine.

Analysis Claim 2

445. **Claim 2 - The editor of claim 1, wherein the data logged to the file and retrieved from the file is measured data.**

446. One of ordinary skill in the art would understand that measured data could be logged to and retrieved from the same file that contains the ladder logic instructions with predictable results. For example, see US Patent No. 4,907,167 to Skeirik (Skeirik), col.19, line 25+, etc.; US Patent No. 4,517,637 to Cassell (Cassell), for "Distributed measurement and control system for industrial processes"; US Patent No. 5,796,602 to Wellan et al. (Wellan), col. 1, line 40+; and US Patent No. 5,134,574 to Beaverstock et al. (Beaverstock).

Analysis Claim 3

447. **Claim 3 - The editor of claim 1, wherein the data logged to the file and retrieved from the file is trend data.**

448. One of ordinary skill in the art would understand that trend data could be logged to and retrieved from the same file that contains the ladder logic instructions with predictable results. For example, Cotugno discloses a "Trend Setup dialogue box." (Col. 45, line 7) U.S. Patent 5,470,218 to Hillman et al. (Hillman) discloses a trend graph in Figure 17. Lemoine discloses "a data base 14 for collecting information relating to the manufacturing process and to build up a history for the purpose of subsequent use in order to study any slow or to cyclic drifts." (Col. 1, lines 56-60) Slow or cyclic drifts correspond to trend data.

Analysis Claim 4

449. **Claim 4 - The editor of claim 1, wherein the data logged to the file and retrieved from the file is a recipe file.**

450. One of ordinary skill in the art would understand that data from a recipe file could be logged to and retrieved from the same file that contains the ladder logic instructions with predictable results. See, for example, U.S. Patent No. 6,453,210 to Belotserkovskiy et al. (Belotserkovskiy), abstract, Figs. 4-5, etc.; U.S. Patent No. 6,438,441 to Jang et al. (Jang), abstract, Fig. 5, etc.; U.S. Patent No. 6,516,233 to Bhagwat et al. (Bhagwat), abstract, Figs. 3 & 5, claims, etc.; U.S. Patent No. 5,792,483 to Siegrist et al. (Siegrist '483), claim 1 at cols. 20-21; U.S. Patent No. 5,911,924 to Siegrist et al. (Siegrist '924); U.S. Patent No. 5,576,946 to Bender et al. (Bender), Fig. 5, claims, etc.; and U.S. Patent No. 6,198,480 to Cotugno et al. (Cotungo)

Analysis Claim 5

451. **Claim 5 - The editor of claim 1, wherein the data retrieved from the file is a user defined routine file.**

452. One of ordinary skill in the art would understand that the data from a user defined routine file could be logged to and retrieved from the same file that contains the ladder logic instructions with predictable results. See, for example, U.S. Patent No. 4,787,035 to Bourne, col. 39, lines 4-10 and U.S. Patent No. 5,193,189 to Flood et al., col. 2, lines 8-15, & cols. 38-40 in the claims; U.S. Patent No. 4,302,820 to Struger et al., abstract, etc.; U.S. Patent No. 6,108,587 to Shearer et al., claims

Analysis Claim 8

453. The table below shows that Chuo when combined with the TRiLOGI commercial product discloses every element of Claim 8 of the '415 patent.

454. The table below shows the TRiLOGI commercial product discloses every element of Claim 8 of the '415 patent.

Cross reference of Claim 8 elements to prior art		
	Chuo	**TRiLOGI**
Claim 1 - An editor for developing ladder logic programs:	X	X
a first instruction that employs a file system to log data…	X	*
a second instruction that employs a file system to retrieve data…	X	*
an implementation for converting the ladder logic instructions…	X	X

Claim 8 – further comprising a plurality of additional instructions…		X

* indicates the file system resides on a networked computer

455. **Claim 8 - The editor of claim 1, further comprising a plurality of additional instructions that facilitate utilizing file system services of the file system.**

456. One of ordinary skill in the art at the time would understand the file services disclosed by the TRiLOGI commercial product could be combined with the invention of Chou according to their known function with predictable results.

457. TRiLOGI provides a plurality of file operations in addition to the logging/saving, retrieve/open, and converting/compiling discussed with respect to Claim 1. See for example page 2-1 of the Programmer's Reference. Among the many file system services disclosed are "Change Dir," "Write to," and "New" services.

Analysis Claim 13

458. The table below shows U.S. Patent 6,519,594 to Chuo (Chuo) discloses every element of Claim 13 of the '415 patent.

459. The table below shows the TRiLOGI commercial product discloses every element of Claim 13 of the '415 patent.

Cross reference of Claim 13 elements to prior art		
	Chuo	**TRiLOGI**
A method for developing ladder logic programs:	X	X
employing a file system that resides on an industrial controller to log data	X	*
employing the file system to retrieve the data from the file containing ladder logic instructions	X	*
converting the ladder logic instructions…	X	X

* indicates the file system resides on a networked computer

460. **Claim 13 - A method for developing ladder logic programs that control operation of an industrial controller system, the method comprising:**

461. As discussed, Chuo discloses a method for developing ladder logic programs that control operation of an industrial control system.

462. As discussed TRiLOGI discloses a method for developing ladder logic programs that control operation of an industrial control system.

463. **employing a file system that resides on an industrial controller to log data to a file containing ladder logic instructions;**

464. As discussed, Chuo employs a file system to log data to a file containing ladder logic instructions.

465. As discussed, TRiLOGI employs a file system that resides on an industrial controller to log data to a file containing ladder logic instructions.

466. **employing the file system to retrieve the data from the file containing ladder logic instructions;**

467. As discussed, Chuo employs a file system to retrieve the data from the file containing ladder logic instructions.

468. As discussed, TRiLOGI employs a file system to retrieve the data from the file containing ladder logic instructions.

469. **converting the ladder logic instructions into instructions understandable and executable by an execution engine in the industrial controller.**

470. As discussed, Chuo discloses the functionality to convert the ladder logic instructions into instructions understandable and executable by an execution engine in the industrial controller.

471. As discussed, TRiLOGI includes the functionality to convert the ladder logic instructions into instructions understandable and executable by an execution engine in the industrial controller.

Count Six: '974 Patent

472. U.S. Patent No. 7,123,974 to Hamilton ('974) discloses a system and methodology providing audit recording and tracking in a real time industrial controller environment.

473. My analysis as detailed below covers every physical element and all of the functionality described in Claims 1, 2, 3, 5, 6, 9, 10, 14, 15, 16, 19, 20, 24, 28, 29, and 30 of the '974 patent.

474. The analysis shows all of the claim limitations to be met by either by a single piece of prior art, or by combining pieces of prior art. When combining pieces of prior art, I have applied elements according to their known function and described the predictable result of their combination.

Analysis Claim 1

475. As shown in the table below, U.S. Patent No. 5,469,352 to Yukutomo (Yukutomo) discloses every element of Claim 1 of the '974 patent. The discussion following the table details the analysis.

476. As shown in the table below, the Cimplicity commercial system discloses every element of Claim 1 of the '974 patent. The discussion following the table details the analysis.

Cross reference of Claim 1 elements to prior art		
	Cimplicity	**Yukutomo**
An electronic audit system for an industrial control environment…	X	X
a recording component to log real time interactions…	X	X
a tracking component to aggregate…	X	X

477. **Claim 1 - An electronic audit system for an industrial control environment, comprising:**

478. Yukutomo discloses such a system that includes a change detection means, a history buffer, an external output means, an external memory unit and a display means. See for example Col.1 line 59 to Col. 2 line 5.

479. The Cimplicity Base System User's Manual 1997 discloses such an electronic audit system as a "Security Audit Trail." See for example pages 28-3 to 28-4.

480. **a recording component to log real time interactions with one or more industrial control components;**

481. Yukutomo discloses logging changes to a recording component called a "history buffer 5." This logging happens in real-time because it is logged as the physical changes occur (rather than in a simulation or off-line mode).

482. Cimplicity logs real time interactions as alarms. See for example pages 28-3 to 28-4 of the Cimplicity Base System User's Manual 1997.

483. **a tracking component to aggregate the real time interactions to facilitate generation of audit data relating to the one or more industrial control components.**

484. Yukutomo discloses a ring buffer in Figure 3. that aggregates the real-time data into groups of 12.

485. Cimplicity aggregates the audit data "in the Event Log table of Database Logger." (Page 28-3 of the Cimplicity Base System User's Manual 1997)

Analysis Claim 2

486. As shown in the table below, Yukutomo discloses every element of Claim 2 of the '974 patent. The discussion following the table details the analysis.

487. As shown in the table below, the Cimplicity commercial system discloses every element of Claim 1 of the '974 patent. The discussion following the table details the analysis.

Cross reference of Claim 2 elements to prior art		
	Cimplicity	**Yukutomo**
Claim 1 - An electronic audit system for an industrial control environment…	X	X
a recording component to log real time interactions…	X	X
a tracking component to aggregate…	X	X
Claim 2 – at least one of the recording component…	X	X

488. **The system of claim 1, at least one of the recording component and the tracking component are associated with an access tool that interacts with the one or more industrial control components via a network.**

489. Yukutomo discloses: "The external output means 7 outputs the history data stored in the history buffer 5 to the external memory unit 8 in response to a command from the operator." (Col. 3, line 66 to Col. 4, line 2) Yukutomo further discloses: "The external memory unit is comprised of, for example, a floppy disk unit, a hard disk unit, a personal computer or a numerical control apparatus connected to a communication line, and the like." (Col. 4, lines 2-5) The connection of the personal computer or numerical apparatus to the "programmable machine controller (PMC)" via a communication line constitutes a network of computing devices.

490. Cimplicity discloses such an access tool. (Cimplicity Base System User's Manual 1997 Page 16-1) The access tool is part of the Cimplicity Data Logger functionality. The Cimplicity Data Logger logs data via an ODBC connection: "The Database Logger option lets you log alarms, events, and point values to a database, then retrieve the information for reports via a wide variety of ODBC compliant applications." (Cimplicity Base System User's Manual 1997 Page 16-1) One of ordinary skill in the art would understand ODBC (Open Database Connectivity) supports both local and network connections to the database.

Analysis Claim 3

491. As shown in the table below, Yukutomo discloses every element of Claim 3 of the '974 patent. The discussion following the table details the analysis.

492. As shown in the table below, the Cimplicity commercial system discloses every element of Claim 3 of the '974 patent. The discussion following the table details the analysis.

Cross reference of Claim 3 elements to prior art		
	Cimplicity	**Yukutomo**
Claim 1 - An electronic audit system for an industrial control environment…	X	X
a recording component to log real time interactions…	X	X
a tracking component to aggregate…	X	X
Claim 2 – at least one of the recording component…	X	X
Claim 3 – the access tool includes at least one of an editing tool…	X	X

493. **The system of claim 2, the access tool includes at least one of an editing tool, a programming tool, a communications component, a monitoring component, a maintenance component, a browser, a graphical user interface (GUI), and a database application that interacts with the one or more industrial control components.**

494. As discussed, Yukotomo discloses a communication line that corresponds to the communications component in this claim. In addition, Yukutomo discloses: "Further, the analysis of the history data of each fault stored in the external memory unit 8 enables to specify the overall factors of the faults, including operation and the like, which are liable to be taken by mistake when a fault is caused." (Col. 4, lines 52-56) At the time of the '974 Patent browsers, GUIs and database applications were common. Indeed, Yukutomo discloses a GUI for history data analysis. One of ordinary skill in the art would have understood that the analysis Yukutomo describes at the "external memory unit 8" could have been via a browser, a GUI or a database application according to their known functions and with predictable behavior.

495. Cimplicity discloses such an access tool. (Page 16-1 of the Cimplicity Base System User's Manual 1997)

Analysis Claim 5

496. As shown in the table below, Yukutomo discloses every element of Claim 5 of the '974 patent. The discussion following the table details the analysis.

497. As shown in the table below, the Cimplicity commercial system discloses every element of Claim 5 of the '974 patent. The discussion following the table details the analysis.

Cross reference of Claim 5 elements to prior art		
	Cimplicity	**Yukutomo**
Claim 1 - An electronic audit system for an industrial control environment…	X	X
a recording component to log real time interactions…	X	X
a tracking component to aggregate…	X	X
Claim 2 – at least one of the recording component…	X	X
Claim 3 – the access tool includes at least one of an editing tool…	X	X

Claim 5 – at least one of a local factory network…	X	X

498. **The system of claim 2, the network includes at least one of a local factory network, a wireless network, and public network.**

499. Yukutomo discloses a local factory network in that he describes a "personal computer," "numerical control apparatus," and a "programmable machine controller" connected via a communication line.

500. Cimplicity discloses such an access tool. (Cimplicity Base System User's Manual 1997 Page 16-1) The access tool is part of the Cimplicity Data Logger functionality. The Cimplicity Data Logger logs data via an ODBC connection (Cimplicity Base System User's Manual 1997 Page 16-1) One of ordinary skill in the art would understand ODBC (Open Database Connectivity) supports both local and network connections to the database. One form of the network would be a local factory network. As discussed, Cimplicity implements its audit functionality as alarms. Cimplicity discloses alarms broadcasting on a local network. (Page 11-5 of the Cimplicity Base System User's Manual 1997)

Analysis Claim 6

501. As shown in the table below, Yukutomo discloses every element of Claim 6 of the '974 patent. The discussion following the table details the analysis.

502. As shown in the table below, the Cimplicity commercial system discloses every element of Claim 6 of the '974 patent. The discussion following the table details the analysis.

Cross reference of Claim 6 elements to prior art		
	Cimplicity	**Yukutomo**
Claim 1 - An electronic audit system for an industrial control environment…	X	X
a recording component to log real time interactions…	X	X
a tracking component to aggregate…	X	X
Claim 2 – at least one of the recording component…	X	X
Claim 6 – the recording component logs interaction data…	X	X

503. **The system of claim 2, the recording component logs interaction data that has been directed to the one or more industrial control components during a current application session associated with the access tool.**

504. In Yukutomo, a recording component that logs real time interactions as claimed in claim 1 of the '974 patent, and the recording component logs "data" generally and "interaction data" specifically.

505. The Cimplicity commercial system includes a recording component that logs real time interactions as set forth above for claim 1. This recording component logs "data" generally and "interaction data" more specifically.

Analysis Claim 9

506. As shown in the table below, Yukutomo discloses every element of Claim 9 of the '974 patent. The discussion following the table details the analysis.

507. As shown in the table below, the Cimplicity commercial system discloses every element of Claim 9 of the '974 patent. The discussion following the table details the analysis.

Cross reference of Claim 9 elements to prior art		
	Cimplicity	**Yukutomo**
Claim 1 - An electronic audit system for an industrial control environment…	X	X
a recording component to log real time interactions…	X	X
a tracking component to aggregate…	X	X
Claim 9 – in at least one of a local storage…	X	X

508. **The system of claim 1, the tracking component aggregates activities logged by the recording component in at least one of a local storage and a remote storage location.**

509. Yukutomo discloses "the ring buffer 5a can be comprised of a predetermined number of the elements in accordance with, for example, the capacity of the nonvolatile memory 14 shown in FIG.2." (Col. 5, lines 16-19) Nonvolatile memory 14 is local storage.

510. As discussed aggregates activities via its "Database Logger" functionality. The Cimplicity Data Logger logs data via an ODBC connection (Cimplicity Base System User's Manual 1997,

Page 16-1) One of ordinary skill in the art would understand ODBC (Open Database Connectivity) supports both local and network connections to the database.

Analysis Claim 10

511. As shown in the table below, Yukutomo discloses every element of Claim 10 of the '974 patent. The discussion following the table details the analysis.

512. As shown in the table below, the Cimplicity commercial system discloses every element of Claim 10 of the '974 patent. The discussion following the table details the analysis.

Cross reference of Claim 10 elements to prior art		
	Cimplicity	**Yukutomo**
Claim 1 - An electronic audit system for an industrial control environment…	X	X
a recording component to log real time interactions…	X	X
a tracking component to aggregate…	X	X
Claim 9 – in at least one of a local storage…	X	X
Claim 10 – at least one of a file, schema, and data structure…	X	X

513. **The system of claim 9, the tracking component aggregates transaction data by creating at least one of a file, schema, and a data structure in the local or remote storage locations, and tags the file, schema, and data structure with an identifier relating to the one or more industrial control components that have been accessed.**

514. Yukutomo discloses the schema, structure, of this history buffer is "12 elements E1—E12 which are annularly connected to each other." (Col. 4, lines 62-63)

515. Cimplicity aggregates with such tags, schema and data. (Page 11-5 of the Cimplicity Base System User's Manual 1997)

Analysis Claim 14

516. As shown in the table below, Yukutomo discloses every element of Claim 14 of the '974 patent. The discussion following the table details the analysis.

517. As shown in the table below, the Cimplicity commercial system discloses every element of Claim 14 of the '974 patent. The discussion following the table details the analysis.

Cross reference of Claim 14 elements to prior art		
	Cimplicity	**Yukutomo**
Claim 1 - An electronic audit system for an industrial control environment…	X	X
a recording component to log real time interactions…	X	X
a tracking component to aggregate…	X	X
Claim 14 – generate an audit report that describes interactions…	X	X

518. **The system of claim 1, at least one of the recording component and the tracking component are employed to generate an audit report that describes interactions that have occurred with the one or more industrial control components.**

519. Yukutomo's Figure 5 shows an audit report that contains all of the elements of this claim.

520. As discussed Cimplicity logs audit data as part of its "Database Logger" functionality. Page 16-49 of the Cimplicity Base System User's Manual 1997 describes how a Database Logger report is written to, for example, a Microsoft Access or SQL database, and Page 16-54 of the Cimplicity Base System User's Manual 1997 shows a Database Logger report.

Analysis Claim 15

521. Yukutomo in combination with an electronic validation procedure contains all of the elements of claim 15 of the '974 patent.

522. Cimplicity in combination with an electronic validation procedure contains all of the elements of claim 15 of the '974 patent.

Cross reference of Claim 15 elements to prior art		
	Cimplicity	**Yukutomo**
Claim 1 - An electronic audit system for an industrial control environment…	X	X
a recording component to log real time interactions…	X	X
a tracking component to aggregate…	X	X

Claim 14 – generate an audit report that describes interactions…	X	X
Claim 15 – electronic validation procedure…		

523. **The system of claim 14, the audit report is employed as part of an electronic validation procedure to facilitate compliance with one or more regulations.**

524. One of ordinary skill in the art would have understood Yukutomo's audit report shown in Figure 5 could have been employed as part of an electronic validation procedure with predictable results.

525. One of ordinary skill in the art would have understood audit reports as disclosed by Cimplicity could have been employed as part of an electronic validation procedure with predictable results.

Analysis Claim 16

526. As shown in the table below, Yukutomo discloses every element of Claim 16 of the '974 patent. The discussion following the table details the analysis.

527. As shown in the table below, the Cimplicity commercial system discloses every element of Claim 16 of the '974 patent. The discussion following the table details the analysis.

Cross reference of Claim 16 elements to prior art		
	Cimplicity	**Yukutomo**
Claim 1 - An electronic audit system for an industrial control environment…	X	X
a recording component to log real time interactions…	X	X
a tracking component to aggregate…	X	X
Claim 14 – generate an audit report that describes interactions…	X	X
Claim 16 – the audit report contains 1 to N fields…	X	X

528. **The system of claim 14, the audit report includes 1 to N fields, N being an integer, the fields displaying various types of auditing information.**

529. In Fig. 5 of Yukutomo, fields 1 to 30 (30 being an integer) display various types of auditing information.

530. Page 16-54 of the Cimplicity Base System User's Manual 1997 shows a Database Logger report worksheet with "Point ID", "Start Time" and "End Time". These represent fields 1 to 3, 3 being an integer, displaying various types of audit information.

Analysis Claim 19

531. As shown in the table below, Yukutomo discloses every element of Claim 19 of the '974 patent. The discussion following the table details the analysis.

532. As shown in the table below, the Cimplicity commercial system discloses every element of Claim 19 of the '974 patent. The discussion following the table details the analysis.

Cross reference of Claim 19 elements to prior art		
	Cimplicity	**Yukutomo**
Claim 1 - An electronic audit system for an industrial control environment…	X	X
a recording component to log real time interactions…	X	X
a tracking component to aggregate…	X	X
Claim 19 – server repository to receive audit data…	X	X

533. **The system of claim 1, further comprising a server repository to receive audit data that has been recorded from the one or more industrial control components.**

534. Yukutomo discloses a server repository as "external memory unit 8" that receives history data.

535. As discussed Cimplicity logs audit data via an ODBC connection. One of ordinary skill in the art understands an ODBC connection is made to a database server.

Analysis Claim 20

536. Yukutomo in combination with an analysis component of contains all of the elements of claim 20 of the '974 patent.

537. Cimplicity in combination with an analysis component of contains all of the elements of claim 20 of the '974 patent.

Cross reference of Claim 20 elements to prior art		
	Cimplicity	**Yukutomo**
Claim 1 - An electronic audit system for an industrial control environment…	X	X
a recording component to log real time interactions…	X	X
a tracking component to aggregate…	X	X
Claim 19 – server repository to receive audit data…	X	X
Claim 20 – determine whether an industrial control process at one of meets…		

538. **The system of claim 19, further comprising an analysis component that is applied to the audit data to further determine whether an industrial control process at least one of meets, exceeds, and is below existing or emerging regulations, standards, and quality thresholds.**

539. One of ordinary skill in the art would have understood Yukutomo's audit report shown in Figure 5 could predictably have been used to determine whether an industrial control process at least one of meets, exceeds, and is below existing or emerging regulations, standards, and quality thresholds.

540. One of ordinary skill in the art would have understood the Cimplicity audit reports could predictably have been used to determine whether an industrial control process at least one of meets, exceeds, and is below existing or emerging regulations, standards, and quality thresholds.

Analysis Claim 24

541. As shown in the table below, Yukutomo discloses every element of Claim 24 of the '974 patent. The discussion following the table details the analysis.

542. As shown in the table below, the Cimplicity commercial system discloses every element of Claim 24 of the '974 patent. The discussion following the table details the analysis.

Cross reference of Claim 24 elements to prior art		
	Cimplicity	**Yukutomo**
A method for verifying an industrial control process…	X	X
monitoring activity data…	X	X
tagging at least on file…	X	X
logging the activity data…	X	X
aggregating the logged activity data…	X	X

543. **Claim 24 - A method for verifying an industrial control process, comprising:**

544. Yukutomo discloses such a method that employs a change detection means, a history buffer, an external output means, an external memory unit and a display means. See for example Col.1 line 59 to Col. 2 line 5.

545. The Cimplicity Base System User's Manual 1997 discloses such a method for verifying an industrial control process via "Security Audit Trail" functionality.

546. **monitoring activity data directed to one or more control components;**

547. Yukutomo discloses a "change detection means" that monitors the activity of a programmable machine controller.

548. As discussed Cimplicity implements monitoring activity via alarms.

549. **tagging at least one file that is related to the one or more control components;**

550. Yukutomo discloses such tags. See for example Figure 4.

551. As discussed Cimplicity implements data logging via a database. One of ordinary skill in the art understands databases are composed of one or more files having "tags" that identify them.

552. **logging the activity data in at least one of a local and remote location;**

553. In Yukutomo, activity data is logged to "external memory unit 8."

554. Cimplicity implements its audit functionality as alarms. (Page 16-2 of the Cimplicity Base System User's Manual 1997) Cimplicity discloses alarms broadcasting on a local network. (Page 11-5 of the Cimplicity Base System User's Manual 1997)

555. **aggregating the logged activity data in the at least one file.**

556. Yukutomo discloses "external memory unit 8" comprises a "floppy disk unit," a "hard disk unit," or "a personal computer." These devices aggregate data in files.

557. As discussed Cimplicity implements data logging via a database. One of ordinary skill in the art understands databases are composed of one or more files.

Analysis Claim 28

558. As shown in the table below, Yukutomo discloses every element of Claim 28 of the '974 patent. The discussion following the table details the analysis.

559. As shown in the table below, the Cimplicity commercial system discloses every element of Claim 24 of the '974 patent. The discussion following the table details the analysis.

Cross reference of Claim 28 elements to prior art		
	Cimplicity	**Yukutomo**
A audit system for an industrial control process, comprising:	X	X
means for logging current access attempts…	X	X
means for at least one of communicating…	X	X
means for storing the access attempts;	X	X
means for generating a report…	X	X

560. **Claim 28 - A audit system for an industrial control process, comprising:**

561. Yukutomo discloses such an audit system that includes a change detection means, a history buffer, an external output means, an external memory unit and a display means. See for example Col.1 line 59 to Col. 2 line 5.

562. The Cimplicity Base System User's Manual 1997 discloses such an audit system for an industrial control process as a "Security Audit Trail."

563. **means for logging current access attempts for an industrial control process;**

564. In Yukutomo, a keyboard 17 is used by an operator to log current access attempts for an industrial control process and is thus a means for logging current access attempts for an industrial control process.

565. Cimplicity discloses alarms for logging database access attempts.

566. **means for at least one of communicating and categorizing the access attempts;**

567. The specification of the '415 patent does not identify a structure as corresponding to such means.

568. In Yukutomo, there is a key input means 2 for outputting a key signal of an operation key depressed by an operator (col. 1, lines 55-57), as well as change detection means 3. See Col.3, lines 44 and 50+.

569. Cimplicity discloses a Database Logger for communicating and categorizing user access attempts.

570. **means for storing the access attempts;**

571. Yukutomo's history buffer 5, for example, stores the access attempts. Yukutomo's external memory unit 8 also stores the access attempts.

572. Cimplicity discloses a database for storing access attempts.

573. **means for generating a report that details the access attempts that have occurred over time.**

574. In Yukutomo, the display control means 6 displays on the display unit 16 history data stored in the history buffer 5. (Col.3, lines 64-66) As shown by Figure 5 of Yukutomo, the report details access attempts that have occurred over time.

575. Cimplicity discloses reports for database data that includes access attempts. (Page 16-2 of the Cimplicity Base System User's Manual 1997)

Analysis Claim 29

576. As shown in the table below, Yukutomo discloses every element of Claim 29 of the '974 patent. The discussion following the table details the analysis.

577. As shown in the table below, the Cimplicity commercial system discloses every element of Claim 29 of the '974 patent. The discussion following the table details the analysis.

Cross reference of Claim 29 elements to prior art		
	Cimplicity	**Yukutomo**
An audit system for an industrial control process…	X	X
a computer readable medium having stored…	X	X
a first data field representing real time access data…	X	X
a second data field representing a tag name…	X	X
a third data field to categorize…	X	X

578. **Claim 29 - A computer readable medium having stored thereon a data structure, comprising:**

579. Yukutomo discloses an external memory unit 8 that is such a computer readable medium.

580. The Cimplicity Base System User's Manual 1997 discloses such a system for an industrial control process as a "Security Audit Trail."

581. **a first data field representing real time access data to an industrial control component;**

582. Yukutomo's Figure 4 shows time data 104 that is a first data field that represents real-time access.

583. Pages 16-54 and -56 of the Cimplicity Base System User's Manual 1997 show a first data field that includes a real-time timestamp.

584. **a second data field representing a tag name to store and aggregate the real time access data;**

585. Yukutomo's Figure 4 shows header 101 that represents a tag name to store and aggregate the real time access data.

586. Pages 16-55 and -56 of the Cimplicity Base System User's Manual 1997 show a second data field ("Point ID") that aggregates the access data.

587. **a third data field to categorize the real time access data.**

588. Yukutomo's Figure 4 shows signal discrimination data that categorizes the real time access data.

589. Page 16-56 of the Cimplicity Base System User's Manual 1997 shows a third data field (for example, "_ALRM") that categorizes the access data.

Analysis Claim 30

590. Yukutomo in combination with the SQL of Cimplicity contains all of the elements of claim 30 of the '974 patent.

591. As shown in the table below, the Cimplicity commercial system discloses every element of Claim 30 of the '974 patent. The discussion following the table details the analysis.

Cross reference of Claim 30 elements to prior art		
	Cimplicity	**Yukutomo**
Claim 29 - An audit system for an industrial control process…	X	X
a computer readable medium having stored…	X	X
a first data field representing real time access data…	X	X
a second data field representing a tag name…	X	X
a third data field to categorize…	X	X
Claim 30 – the data structure is at least one of an XML schema…	X	

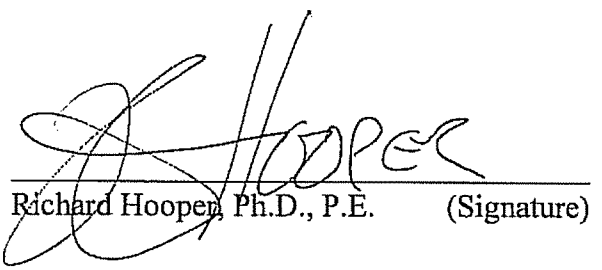
592. **The medium of claim 29, the data structure is at least one of an XML schema and an SQL file.**

593. "The external memory unit is comprised of, for example, a floppy disk unit, a hard disk unit, a personal computer or a numerical control apparatus connected to a communication line, and the like." (Col. 4, lines 2-5) One of ordinary skill in the art would have understood that this data could have been structured as XML or accessed via SQL query with predictable results.

594. As discussed Cimplicity logs audit data via an ODBC connection. One of ordinary skill in the art understands ODBC data is stored and retrieved via SQL. See for example "SQLDATA.XLS" on page 16-49 of the Cimplicity Base System User's Manual 1997.

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF WISCONSIN

I declare under penalty of perjury that the foregoing Declaration of Richard Hooper, Ph.D., P.E.is true and correct to the best of my knowledge and belief. Executed on February 23 2012.



Richard Hooper, Ph.D., P.E. (Signature)

ATTACHMENT A

CV of Richard Hooper, Ph.D., P.E.

RICHARD HOOPER, Ph.D., P.E.
1102 Bowie Rd
Austin, Texas 78733
(512) 699-6487

SUMMARY

- Expertise in automation, instrumentation, electro-mechanical systems and software
- Technical architect of multi-million dollar projects with Fortune 500 companies and Federal agencies including: Whirlpool, Michelin, Merck, NASA and the US DOE
- Principal Engineer at AAI, Inc.
- Former Chief Scientist of the Robotics Research Group at the University of Texas
- Former Principal Engineer at Eaton Corporation
- Over twenty years of industrial and research experience in highly technical environments
- Author on over twenty-five technical publications and government reports
- Author and architect of five copyrighted software systems

EDUCATION

PhD – Robotics and Automation, The University of Texas at Austin; 1994
MSME – Biomedical Engineering, The University of Texas at Austin; 1991
BSEE – Biomedical Instrumentation and Computer Engineering, Rice University; 1985

AWARDS AND PROFESSIONAL

NASA Certificate of Merit, Judge R&D Magazine Top 100 Developments, C. Rowe Fellow, Tau Beta Pi, IEEE Division X Professional Activities Chairman, Registered Professional Engineer

COMPUTER

Oracle, SQL Server, SQL, C/C++, C#, Java, ASP, ASP.net, VB, Windows, Unix, Ladder Logic, RSLogix, CX Programmer

EMPLOYMENT HISTORY

AAI, Inc: Austin, Texas August 2004 - Present
Principal Engineer

- Ultimate responsibility for technical success of projects
- Responsible for electrical, mechanical and software engineering design
- AAI products include unmanned aircraft and ground control technologies; high-fidelity simulation systems; and automated test and measurement equipment

SafeMachines, PLLC: Austin, Texas October 2003 – Present
Founder and President

- Company formed to provide engineering consulting and forensic support services
- Customers include Image Microsystems, Prime Designs and Linear Technologies
- SafeMachines specializes in computer controlled machines

Fusion Technologies; Austin, Texas October 2003 – August 2004

Senior Architect

- Technical lead of team starting Austin office for this ten year-old consulting company
- Set strategies, goals and milestones for office
- Grew office from zero to six customers in first nine months

Trilogy Development Group; Austin, Texas November 1998 – Oct. 2003

Technical Delivery Owner

- Primary owner of technical delivery at all Fortune 500 pricing customers
- Delivered customer success at Whirlpool, Michelin, Eaton and Merck
- Optimized query structure for 100X performance improvement at Michelin
- Lead consultant on team that founded Trilogy's support organization

Senior Developer

- Inventor and architect of Incentive Program Manager application
  - Led team of developers producing application
  - Created and managed budget and timeline for the application development
- Designed database structure for query optimization of very large (>10^8 rows) tables
- Invented patent-pending algorithm for transaction and promotion calculations
- Lead developer for contract and pricing management applications

Eaton SEO; Austin, Texas April 1997 – November 1998

Principal Engineer

- Led team of software, mechanical and electrical engineers as manager of major machine productivity project
- Designed a 3-axis electronic controller with electrical isolation, analog electronics, A/D, D/A and digital electronics
- Solved a complex resonance problem that had plagued the primary product line for years
- Robotics lead on 300mm product development

The Robotics Research Group; Austin, Texas January 1994 – April 1997

Deputy Director

- Managed multi-million dollar projects with the Department of Energy and NASA
- Managed 30+ graduate engineers
- Managed 16,000 sq. ft. laboratory with clean room, metrology and two-story high bay

Chief Scientist

- Conducted independent research with more than $1.25 million in research funds
- Developed advanced software for fault-tolerant control, operation in radiation fields, tool performance relationships, man/machine interfaces, real time optimization, servo motion control and PLC-based systems
- Developed hardware and software for a 2-axis motion controller
- Developed 5-axis motion controller for AC motors
- Taught robotics & automation, instrumentation and technical writing courses

- Guest lecturer at ITESM University in Mexico City, Mexico and The Institute For Robotics in Dortmund, Germany

Electro Cube Inc.; Los Angeles, California May 1986 – September 1987
Electrical Engineer

- Designed an instrument that measured current on the order of 10^{-9} amps and included an auto-calibration circuit
- Designed a tuned-oscillating electronic ballast for fluorescent tubes on aircraft
- Supported production machinery

Platt-Hardin Inc.; Houston, Texas May 1985 – May 1986
Electrical Engineer

- Designed and supervised the manufacture of synchronous motor controllers for the City of Houston
- Designed and developed a temperature controller for a heat-treating oven
- Supported production equipment

Methodist Hospital; Houston, Texas May 1984 – August 1984
Instrumentation Engineer

- Designed instrument for inducing pressure changes during balloon angioplasty
- Assisted development of instruments for measuring blood flow using ultrasound

TECHNICAL PUBLICATIONS

R. Hooper, D. Shuffield, K. Merchant, D. Savage. "Common RF Test Platform." IEEE Autotestcon 2011. September 12, 2011.

R. Hooper. "Optimal Switching Architecture for Automated Test Equipment." IEEE Autotestcon 2011. September 12, 2011.

R. Hooper and D. Tesar. "Robotic Systems Safety." The Next Wave of Technology Workshop. August 30, 2010.

R. Hooper, W. Guy, R. Perrault. "A Current-Controlled Variable Inductor." IEEE Autotestcon 2010. September 13, 2010.

"R. Paulson, R. Hooper. "nvSRAM Improves Robotic System Safety." Industrial Embedded Systems, Volume 3, Number 2, 2007, Pages: 24-30.

C. Cocca, D. Cox, D. Tesar, R. Hooper. "Failure Recovery in Redundant Serial Manipulators." Proceedings of The World Automation Conference 2000 (WAC 2000). June, 2000.

R. Hooper. "A Simulated Annealing Optimization Algorithm Implemented Within an Operator-Assist Interface." IEEE International Conference on Robotics and Automation, Volume 1, 1997, Pages: 656 – 661.

R. Hooper, M. Noakes. "Kinematic Control Models for Teleoperation of Redundant Robots." American Nuclear Society Seventh Topical Meeting on Robotics and Remote Systems. April, 1997, Augusta, Georgia.

R. Hooper. "Using Telescience to Share NASA Resources During the Classroom Study of a Mars Sample and Return Mission." 1997 ASEE/GSW Annual Conference, March 1997, Houston, Texas.

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R. Hooper, C. Kapoor. "Motion Coordination for Redundant Robots by Tracking Position-Level Equality Constraints." IEEE International Conference on Robotics and Automation, 1996, Silver Spring, Maryland.

R. Hooper, D. Tesar, D. Sreevijayan, J. Geisinger, C. Kapoor. "A Four-Level Mechanical Architecture for Fault-Tolerant Robots." Journal of Reliability Engineering and System Safety, Volume 53, Number 3, 1996, Pages: 237-246.

R. Hooper, C. Kapoor, D. Tesar. "Decision Making Software for Dual-Arm Operations in Nuclear Facility Decontamination and Dismantlement." International Symposium on Robotics and Manufacturing, 1996.

R. Hooper, "A Number of Simulated Robot Applications." 1996 IEEE International Conference on Robotics and Automation." April 1996, Video Proceedings.

R. Hooper, S. Sreenivasan. "Using Telescience to Enrich Engineering Education." University of Texas Academic Development, September 1996.

C. Kapoor, N. Pettus, R. Hooper, D. Tesar." Computer Considerations for Advanced Robotics." Proceedings of The 1996 ASME Design Engineering Technical Conferences and Computers in Engineering Conference, Irvine, California, August 18-22, 1996.

C. Kapoor, N. Pettus, R. Hooper, D. Tesar. "Hardware and Software Considerations for Advanced Robotics." Proceedings of The 1996 Symposium on Ship Building, 1996, San Diego, California.

D. Tesar, J. Chladek, R. Hooper, D. Sreevijayan, C. Kapoor, J. Geisinger, M. Meaney. G.

Browning, K. Rackers. "Advanced Development for Space Robotics with Emphasis on Fault-Tolerance." 29th Aerospace Mechanism Symposium, May 17-19, 1995.

R. Hooper, D. Tesar. "Motion Coordination Based on Multiple Performance Criteria with a Hyper-Redundant Serial Robot Example." Proceedings of the 1995 IEEE International Symposium on Intelligent Control, 27-29 Aug. 1995, Pages: 133 – 138.

D. Tesar, C. Kapoor, R. Hooper. "Advanced Digital Control Technology for Precision Machines in Manufacturing." International Symposium on Measurements and Control in Robotics, Bratislava, Slovakia, 1995.

D. Tesar, R. Hooper. "Final Report – U.S. Department of Energy Nuclear Energy University Program in Robotics for Advanced Reactors." Grant Number DE-FG02-86NE37966, April 1995.

R. Hooper. "Multicriteria Inverse Kinematics for General Serial Robots." Thesis (PhD)—University of Texas at Austin, 1994.

R. Hooper, D. Tesar. "Computer-aided Configuration of Modular Robotic Systems." Journal of Computing and Control Engineering, Volume: 5, Issue: 3, June 1994, Pages: 137 - 142.

R. Hooper, K. Diller. "A Musculotendon Model Suitable for Use in Neuromusculoskeletal Control Simulation." International Conference on Bond Graph Modeling ICBGM'93, San Diego, SCS Publishing, Simulation Series, Vol.25, 1993, Pages: 333-338.

R. Hooper, D. Tesar, G. Browning. "Generalized Inverse Kinematics for N Degree-of-Freedom Robot Manipulator." Robotics and Machine Perception, February 1993, Page: 5.

R. Ambrose, D. Tesar, R. Ambrose. "An Experimental Investigation of Robot Actuator Performance." Proceedings of the Second International Symposium on Measurement and Control in Robotics, November 1992, Pages: 623 – 630.

R. Hooper, "Intelligent Robot Control." DOE/NE Robotics for Advanced Reactors Student Conference, Oak Ridge National Laboratory, January 1992.

R. Hooper. "The Interactive Assembly and Computer Animation of Reconfigurable Robotic Systems." Thesis (M.S. in Engineering) -- University of Texas at Austin, 1990.

ATTACHMENT B

Testimony Over Past 4 Years

RICHARD HOOPER, Ph.D., P.E.
1102 Bowie Rd
Austin, Texas 78733
(512) 699-6487

Testimony Over Past 4 Years

CASE NO. 11 000730 NP: SUSAN YOUNG WILLIAMSON, v. CHRYSLER GROUP LLC, a foreign limited liability company; TRANSBOTICS, a foreign corporation; GREAT AMERICAN FOODS INC., a Michigan corporation - STATE OF MICHIGAN, IN THE CIRCUIT COURT FOR THE COUNTY OF WAYNE

CASE NO. 6:09-cv-414: CANRIG DRILLING TECHNOLOGY LTD, vs. OMRON OILFIELD AND MARINE INC., et al. September 2009 to May 2011 - THE UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS

CASE NO. CV-08-865-CNP: MATT KOESSEL and PEGGY WILLOUGHBY KOESSEL, VS. HYUNDAI MOTOR MANUFACTURING OF ALABAMA, LLC, et al. December 2010 to May 2011 - IN THE CIRCUIT COURT OF MONTGOMERY COUNTY, ALABAMA

CAUSE NO. 09-61431-4: CIVIL ACTION. BENNIE C. GARCIA v. CHRISTUS SPOHN HEALTH SYSTEM, D/B/A CHRISTUS SPOHN HOSPITAL CORPUS CHRISTI – SOUTH. July 2009 to Dec 2012 – IN THE COUNTY COURT AT LAW, NUMBER FOUR, NUECES COUNTY, TEXAS

CASE NO. 08-CV-856-F: STEPHEN B. GEORGE vs. CURWOOD, INC., a Delaware corporation, BEMIS COMPANY, INC., a Missouri corporation, MACRO ENGINEERING & TECHNOLOGY, INC., a Canadian corporation, SURE CONTROLS, INC., a Wisconsin Corporation, Defendants. February 2009 to October 2010 - THE UNITED STATES DISTRICT COURT FOR THE WESTERN DISTRICT OF OKLAHOMA

ATTACHMENT C

List of References

List of References

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2. CIMPLICITY HMI Pager Operation Manual, GE Fanuc Automation – CIMPLICITY Monitoring and Control Products (October 1997).
3. International Publication WO 97/30879 to Greber et al.
4. LabVIEW RT User Manual, National Instruments (April 1999).
5. LabVIEW User Manual, National Instruments (January 1998).
6. Manual for PLC-Programming with CoDeSys 1.5, User's Guide, by 3S – Smart Software Solutions GmbH (1997).
7. Simatic S7-200 Programmable Controller System Manual, Siemens (1998).
8. TRiLOGI Programmer's Reference, Ladder Logic Editor Compiler Simulator, Versions 3.3 & 4.1 (1999).
9. U.S. Patent No. 4,200,915 to Struger et al.
10. U.S. Patent No. 4,302,820 to Struger et al.
11. U.S. Patent No. 4,517,637 to Cassell.
12. U.S. Patent No. 4,787,035 to Bourne.
13. U.S. Patent No. 4,907,167 to Skeirik.
14. U.S. Patent No. 5,122,948 to Zapolin.
15. U.S. Patent No. 5,127,090 to Ruehle et al.
16. U.S. Patent No. 5,134,574 to Beaverstock et al.
17. U.S. Patent No. 5,193,189 to Flood et al.
18. U.S. Patent No. 5,287,548 to Flood et al.
19. U.S. Patent No. 5,469,352 to Yukutomo.
20. U.S. Patent No. 5,470,218 to Hillman et al.
21. U.S. Patent No. 5,559,794 to Willis et al.
22. U.S. Patent No. 5,576,946 to Bender et al.
23. U.S. Patent No. 5,631,839 to Lemoine.
24. U.S. Patent No. 5,727,170 to Mitchell et al.
25. U.S. Patent No. 5,764,507 to Chuo.

26. U.S. Patent No. 5,792,483 to Siegrist et al.
27. U.S. Patent No. 5,796,602 to Wellan et al.
28. U.S. Patent No. 5,801,942 to Nixon et al.
29. U.S. Patent No. 5,896,292 to Hosaka et al.
30. U.S. Patent No. 5,911,924 to Siegrist et al.
31. U.S. Patent No. 6,108,587 to Shearer et al.
32. U.S. Patent No. 6,198,480 to Cotugno et al.
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34. U.S. Patent No. 6,263,487 to Stripf et al.
35. U.S. Patent No. 6,304,934 to Pimenta et al.
36. U.S. Patent No. 6,438,441 to Jang et al.
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39. U.S. Patent No. 6,519,594 to Li.
40. U.S. Patent No. 6,853,867 to Klindt et al.
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